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*(Electric Light in dull weather.)*

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ENTERTAINMENTS GIVEN.

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THE  
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For  
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*This beautiful and artistic process is very simple, and easily worked. It affords ample opportunity for the display of skill and taste, and it has opened out a splendid field to artistic ability.*

*On the Commercial and Scientific side it is also of great value, and this is confirmed by the large use of it by the Army and Navy departments, the Ordnance Survey, and by many of the Railway Companies and Engineering firms.*

*At page 126 of this work will be found a description of the process.*

*The Prospectus, with List of Papers, &c., and other necessities for the process, which are few and simple, may be had on application.*

**THE PLATINOTYPE CO.**

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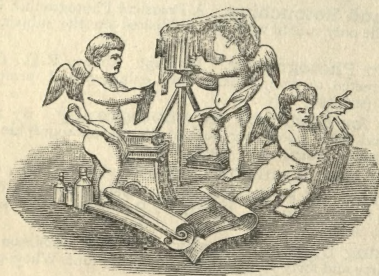
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22nd Edition, Revised and greatly Enlarged. 6 4

THE  
A B C  
OF  
MODERN † (DRY † PLATE)



PHOTOGRAPHY.

.....

The LONDON STEREOSCOPIC & PHOTOGRAPHIC  
COMPANY, LIMITED.

110 & 108, REGENT STREET, W.

22nd Edition of the A B C.

*The A B C of Photography.*

PUBLISHED EVERY FRIDAY. Price 2d.; by Post, 2½d.



The AMATEUR PHOTOGRAPHER is the Special Organ of the Amateur Photographic Societies of Great Britain and the Colonies.

The AMATEUR PHOTOGRAPHER contains Articles upon all subjects, both Technical and Social, interesting to Amateur Photographers.

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EXTRACT FROM "OUR VIEWS" OF THE *Amateur Photographer* OF  
JAN. 22nd, 1886.

"The thanks of the Amateur Photographic World are undoubtedly due to the Company for their untiring enterprise."

## INTRODUCTION.



THE urgent demand for the twenty-first edition of the "A B C of Modern Dry-plate Photography" has given its publishers (the London Stereoscopic and Photographic Company, Limited) an opportunity of enlarging it, and adding to the work much fresh matter which recent advances in the art-science have rendered desirable, if not necessary. The great success which has attended in past years the issue of this Manual is probably due to the following facts. In most treatises for beginners the writer, although in his preface promising to explain things in a manner which may be easily understood by the veriest novice, speedily forgets this promise, and, after the first few pages, launches into technicalities which no one but an expert photographer can comprehend. It is a fault which is common to text-books, and one which an author who is master of his subject is very liable to fall into. He has so long left the grammar of his studies behind him that he forgets how necessary that grammar is to beginners. But we wish to avoid this error: so let it be distinctly understood that we start upon the assumption

that our reader knows nothing whatever of photography and we will endeavour to guide his eye and his hand to the attainment of success.

That great success is possible, and probable, may be readily proved by a glance round the walls of any exhibition of photographic pictures. During the past two years the Company have held in London International Photographic Exhibitions, to which the works of amateurs were alone contributed. The verdict both of the press and the general public upon these works was unanimous, and to the effect that the amateurs, except in the case of portraiture, excelled professional photographers. That this should be so need not create astonishment. The amateur has power and means to buy the best apparatus; he has leisure to use it under the best conditions, and he, as a rule, brings an educated eye and a cultured mind to bear upon his work.

These exhibitions, too, have taught us how widespread is this fashionable hobby of picture-taking. Pictures were sent to us from India and the various Colonies, as well as from America; most European countries were also represented on its walls. The great variety of subjects indicated the numberless ways in which photography can be made subservient to other pursuits. Pictures of yachts and sea-scapes taken from yachts vied in beauty with river scenes and views of inland regattas. Instantaneous pictures of the cricket-field hung side by side with others which showed us huntsmen and hounds in full cry. Then there were numerous Alpine scenes, views in cloudland, and even a series of pictures taken in the depths of a coal-mine. Under the head of "photography at home" came studies of children, of exotic flowers, of pet animals, interior views



of drawing-rooms, and of other subjects too numerous to mention.

The cleanliness of modern photography, as compared with the "black art" which it has superseded, has drawn the fair sex to this beautiful pursuit. Among amateur photographers many ladies take a prominent position, and their work, as might be expected, is distinguished for its elegance and painstaking exactness. They have the comfort of knowing that the art which they have taken up is free of all stain to hands, dress, furniture, and carpets, and that a modern camera in a drawing-room is an ornamental piece of cabinet-work, and not an eyesore.

For the professional man, be he a doctor, an architect, an engineer, a lawyer, or a scientist, a knowledge of photography is now an absolute necessity; and the one who is quick to acknowledge this undoubted fact, and who will take the slight trouble incurred in obtaining a knowledge of the art, will most surely find it very greatly to his profit.

The art is not a difficult one to acquire. A careful perusal of this manual, supplemented by a few lessons from those who are in the habit of teaching beginners, will quickly enable any one with ordinary intelligence to take a presentable photograph. The first part of this book is intended for those who know nothing of the art; the second part can be studied by them later on; while proficient amateurs may probably find therein some information which may be useful to them.

In 1858 we first brought out the "A B C of Photography," a treatise that ran through seventeen editions; and we, therefore, desire to call the attention of the public to the

fact that the "A B C" is the London Stereoscopic Company's title, and that for others to copy this title is merely an attempt to mislead.

We particularly desire to call attention to the various articles from the Press, in relation to lessons in Photography, to be found at the end of this volume.

THE LONDON STEREOSCOPIC AND

PHOTOGRAPHIC COMPANY,

LIMITED.

110 & 108, REGENT STREET, W.

---

N.B.—The following paragraph has since appeared in the daily press and photographic journals, by which it will be seen that our "A B C" is the only "A B C" on photography now published:—

"NOTICE.

"I regret that in publishing my book on modern photography, I have inadvertently taken the title of the London Stereoscopic Company's work, 'The A B C of Photography,' and will henceforth entitle my book 'Burton's Modern Photography.'

"W. K. BURTON.

"1, ADAM STREET, ADELPHI, W.C.,

*November, 1884."*



## TESTIMONIALS.

---

*The following are from a number of Testimonials received  
by the Company:—*

WILFRED POWELL, ESQ., F.R.G.S., *The Croft, Crowborough,  
Sussex.*

“I have much pleasure in testifying to the very efficient manner in which you instructed me in the art of photography. I have succeeded far beyond my expectations in taking pictures abroad by simply following these instructions.”

---

J. T. HOPWOOD, ESQ., M.P., *Ketton Hall, Stamford.*

“I beg to tender you my best thanks for the very complete course of instruction in photography which you gave me at your studios, and also to express my entire satisfaction with the apparatus supplied.”

---

J. HARRIS STONE, ESQ., M.A., 11, *Sheffield Gardens,  
Kensington, W.*

“I am much obliged by the fine photographs of the Peak of Teneriffe which arrived to-day. Please accept my best thanks for the same; they are splendidly printed, and do your establishment credit. I shall in the course of a day or two bring a gentleman to Regent Street who wishes to be taught photography, and if you succeed with him as well as you have with others, I know he will be fully content. I wish you success in your undertaking, as the opening of a studio for amateurs supplies a long-felt want.”

JOHN DUNCUFT, ESQ., B.A., F.R.G.S., *Yacht "Terpsichore."*

"I am much pleased with the last series of photos you have printed for me ; I allude to those taken in the West Indies. I can only repeat what I have personally told you, that out of all the hundred dozens you have done for me I have not yet had a bad print. I shall be glad to know when you have finished the two albums. Your ready-made developer I have found a great boon, and, as it saves all the bother of making one up, I shall in future always use it."

---

"BRYN-Y-NEUADD, LLANFAIRFECHAN, N. WALES.

*"February 3rd, 1885.*

"To the LONDON STEREOSCOPIC COMPANY.

"Gentlemen,

"I have much pleasure in stating that all the apparatus recently supplied by you gives me the greatest satisfaction. I also was much gratified with the course of lessons you gave me, as I had no idea that a knowledge of the art could be so easily attained, and my only regret now is that I did not learn sooner, for in that case I might have brought back a series of views from past yachting cruises, &c.

"I am, gentlemen, yours faithfully,

"SYDNEY PLATT."

---

"CAPE OF GOOD HOPE BANK, LIMITED,

"TARKASTAD, S. AFRICA.

*"October 15th, 1884.*

"Gentlemen,

"You may no doubt remember that I was the purchaser of one of the Company's half-plate sets about three months ago, and I have much pleasure in informing you that the camera works most excellently, and I am now able to state that everything connected with the set is of really good stuff and well worth the money paid for it.

"Yours faithfully,

"BASIL CHRISTIAN."



"OVERCLIFFE, GRAVESEND.

"December 31st, 1886.

"TO THE LONDON STEREOSCOPIC AND PHOTOGRAPHIC  
COMPANY, LIMITED.

"Sirs,

"Having received great attention at your establishment, I shall hope to always remain a customer.

"Yours faithfully,

"THOS. NETTLINGHAM."

"4, MIDDLE TEMPLE LANE, E.C.

"December 30th, 1886.

"Gentlemen,

"I shall be most happy to recommend your establishment to those who may need photographic apparatus, &c.

"Yours faithfully,

"WM. MORTIMER BAYLIS, *Hon. Sec. Postal Photo. Society.*"

"HASKELLS, LYNDHURST.

"December 30th, 1886.

"Mrs. Duff Dunbar writes to send her best thanks to the London Stereoscopic Company, and begs to say that everything she has obtained from them has been so thoroughly good that she always mentions their apparatus when she has an opportunity of doing so, especially in the case of those beginning the study of photography. The Stereoscopic Company, however, are so well known, that mention is hardly necessary."

"PLACE CHARLES, FELIX, NICE, FRANCE,  
*"January 4th, 1887.*

"TO THE LONDON STEREOSCOPIC AND PHOTOGRAPHIC COMPANY,  
 LIMITED.

"Dear Sirs,

"I shall have very much pleasure in bringing under the notice of my friends who may be taking up the study of photography the many advantages of your Company.

"Yours truly,

"T. CHESTER JERVIS."

---

"17, WINDSOR PLACE, CARDIFF.  
*"January 5th, 1887.*

"MESSRS. THE LONDON STEREOSCOPIC COMPANY,  
 110 AND 108, REGENT STREET, W.

"Gentlemen,

"I shall have much pleasure in recommending you to any of my friends who are likely to take up the study of photography. Kindly send me one of your price-lists.

"Yours truly,

"T. HACQUOIL."

---

"THE LILACS, HERBERT ROAD, WIMBLEDON.

*"November 28th, 1885.*

"Dear Sir,

"I have received the enlargement from my negative of my St. Bernard, "Grip," and am exceedingly pleased with it. I am glad to take this opportunity of expressing my entire satisfaction with the whole of the work which has been executed for me from time to time by your Company in the way of improving negatives, printing, &c. The Photographic Outfit which I bought from you has been excellent in every particular, and I am very much indebted to the invariable readiness and politeness with which my many questions have been answered by your assistants for the progress I have made in the fascinating art of photography.

"Yours faithfully,

"HENRY J. FULLJAMES."



"153, Highbury New Park,  
"November 5th, 1885.

"Gentlemen,

"I have great pleasure in stating that the two cameras ( $\frac{1}{4} \times \frac{1}{2}$ ) supplied by you are of first-class workmanship. I also beg to thank you for the very efficient course of instruction you gave me, by which I attained much higher results than I expected.

"I am, gentlemen, yours faithfully,

"ARTHUR SPEYER."

---

"HARROW,  
"February 13th, 1886.

"Gentlemen,

"The dry plates I got from you the other day I find to be the best I have ever used, and will most certainly continue using them.

"I am, gentlemen, yours faithfully,

"J. L. BENTHALL."

---

"KARAD, SĀTARA, BOMBAY.  
"January 27th, 1886.

"Gentlemen,

"The camera and all the apparatus you sent me arrived here quite safely. I am very pleased with the instrument, as well as with your "A B C Book of Photography." I started without knowing anything whatever of photography, and with only your book as a guide have succeeded in producing some very good pictures.

"I am, gentlemen, yours faithfully,

"F. D. TOPHAM."

---

"BARON HILL, BEAUMARIS, N. W.  
"February 14th, 1886.

"Sir Richard Buckeley begs to inform the Stereoscopic Company that the photographic set sent to Lady Magdalen Buckeley to the above address gives every satisfaction."

# EASTMAN'S NEGATIVE PAPER

This Paper has now stood the test of every form of adverse criticism, and is still the only practicable form of flexible Negative Paper upon the Market.

## EASTMAN'S ROLL HOLDERS, EASTMAN'S FILM CARRIERS.

For making 24 Consecutive Exposures upon one Roll of Negative Paper.

For exposing Single Sheets of Negative Paper in any Dark Slide.

AND ALL ACCESSORIES FOR MAKING PAPER NEGATIVES.

TO THE EASTMAN DRY PLATE & FILM CO.

Ashley House, Lillington Ave, Leamington, March 26th, 1886.

DEAR SIRS,—I am very much pleased with the results I have obtained with your new Negative Paper. It develops beautifully, and bears, according to my experience, great latitude of exposure. In regard to your Bromide Paper, there are so many testimonials to its excellence, that I need only say that from the experience I have had of it, it fully deserves all the eulogy it has received.

Yours faithfully,

(Signed) J. L. RANKING, Surgeon-General.

Wiesen, Grisons, Switzerland, December 12th, 1885.

The Eastman Dry Plate and Film Co. will be pleased to hear THAT THE PHOTOGRAPH ESPECIALLY COMMENDED in this week's PHOTOGRAPHIC NEWS amongst Mrs. Burnaby's series, exhibited at the Alpine Club Exhibition on the 17th inst., was taken on the Eastman Paper.

## EASTMAN'S PERMANENT BROMIDE PAPER.

**A—Smooth Surface, Thin Paper.**

**B—Smooth Surface, Heavy Paper.**

**C—Rough Surface, Heavy Paper.**

These papers may be used for positive printing, or copying drawings by contact; for enlargements, plain, or working up in crayon, ink, water-colours, or oils, according as the taste or judgment of the operator may suggest.

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ONE  
PRICE**

Packed in Boxes containing 12 Sheets, in any size, from 4½ by 3½ to, and including, 30 by 25.

This Paper has secured a larger share of public approval than any photographic Paper ever introduced. The ease and certainty with which the finest results are attained, is cause of general comment.

FULL INSTRUCTIONS IN EACH PACKAGE.

43, Warrior-square, St. Leonards-on-Sea, January 7th, 1886.

I have tried all the other processes, but believe that more artistic results can be obtained on the rough paper which you supply than on any other, if dried with a matt surface. The colour is good, and a depth and softness achieved which brings the print to as near perfection as it is possible for a photograph to be. I think the simplicity of working should not be lost sight of, as, having obtained once for all the correct exposure, the other prints can be turned out with absolute certainty.

WILSON NOBLE.

Full information upon application to any Photographic Dealer.

**THE EASTMAN DRY PLATE AND FILM CO.**  
**13, SOHO SQUARE, LONDON, W.**



# *The A B C of Photography.*

---

## PART I.

### I.—Choice of Apparatus.

**T**HIS is, of course, the first matter of importance, and here let us caution the beginner against the false economy of purchasing

#### SECOND-HAND APPARATUS.

Experience has proved that, considering the cost of repairs, which are in most cases highly necessary, and also the trouble and vexation occasioned to the amateur by not being able to obtain the results he anticipated, owing to the apparatus being shaky and not containing the many improvements now made, he will eventually either discontinue the practice of photography, or, throwing aside his present apparatus, purchase an entirely new outfit. Therefore we wish to urge the intending beginner to go to some well-known house and purchase new and good apparatus, which will aid him very materially in his efforts to become a successful amateur photographer.

The London Stereoscopic Company make up complete

sets of apparatus which are most excellent, and are so inexpensive as to be within the range of all.

It is a trite saying that "a bad workman quarrels with his tools"; but it is no less a fact that good photographs cannot be produced with badly-made apparatus. The wood of the camera must be well seasoned, or it will warp with the inevitable exposure to weather which it must of necessity experience. It must also be so carefully designed that it remains absolutely rigid when used, and so neatly made that it is perfectly light-tight. These conditions can only be secured by the employment of first-class materials, and experienced workmen to deal with those materials. The Company can guarantee that the apparatus which they offer will fulfil most thoroughly all the requirements of the photographic worker. The beginner can either purchase a complete set of apparatus comprising everything required, or he can procure them separately.

#### APPARATUS NECESSARY.

See Fig. 1, page 14.

1. A Camera.
2. A Lens.
3. A Tripod Stand.
4. A Focussing Cloth.
5. Four Ebonite Dishes (these are lightest and most portable).
6. About two dozen Dry Plates.
7. A Ruby Lamp, or Ruby Fabric for Dark Room.
8. Two or three Graduated Measures.

The different sizes of cameras which are sold are indicated by the size of the largest picture which they will take. But it may here be noted,—and this is a circumstance not



generally brought to the attention of purchasers,—that a large-sized camera may be made, by an inexpensive adjustment called a “carrier,” to take small pictures. This is of great advantage to a beginner, who can try his ‘prentice hand at small work before he essays to attempt pictures of the largest size that his camera will afford. He can thus economise his plates, and take negatives small enough for after-use as lantern-slides even with a large camera.

The following are the standard sizes of cameras, the figures indicating the maximum size of the picture which each will take :—

Inches.		
$4\frac{1}{4}$	$\times 3\frac{1}{4}$	This is known as quarter-plate size.
5	$\times 4$	
$6\frac{1}{2}$	$\times 4\frac{3}{4}$	This is known as half-plate size.
$7\frac{1}{2}$	$\times 5$	
8	$\times 5$	
$8\frac{1}{2}$	$\times 6\frac{1}{2}$	This is known as whole-plate size.
9	$\times 7$	
10	$\times 8$	
12	$\times 10$	{ This size has for many years been considered as the largest, but cameras and plates are now supplied to take pictures measuring 15 $\times$ 12, 20 $\times$ 16, and even larger sizes to order.

The purchaser is earnestly advised to see the various sizes for himself. At the Company’s studio he can also see prize pictures from various exhibitions taken on every size of plate. We append a cut of a camera, which represents a singularly complete form of apparatus. To the lens is attached a “shutter” for taking instantaneous pictures (described later on), and on the top of the camera is a

"finder." This useful addition to the camera gives a miniature view of the scene which is covered by the larger lens below, so that the operator can take his picture at the

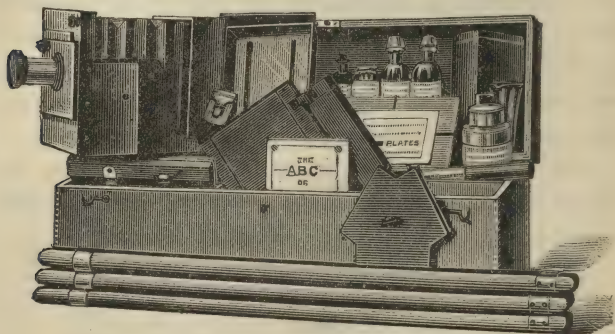


Fig. 1.—Photographic Outfit.

precise moment when any moving object is in the field of view.

The entire apparatus requisite for taking a number of pictures is so very compact, and so much ingenuity has been exerted in reducing the bulk of all articles to the lowest limit, that a photographic tourist is not impeded by a number of extra packages. Indeed, he can for a moderate sum supply himself with a Gladstone bag which will not only carry his apparatus, but his personal belongings as well. More than this, the bag will serve him as a dark tent in which he can change his plates, replacing those which have been used by fresh ones from his store. (See Fig. 32.)

For those who prefer a tent arrangement in which their gelatine plates can receive that treatment called "development," which turns them into pictures, the "Eclipse" developing and changing tent may be recommended. It

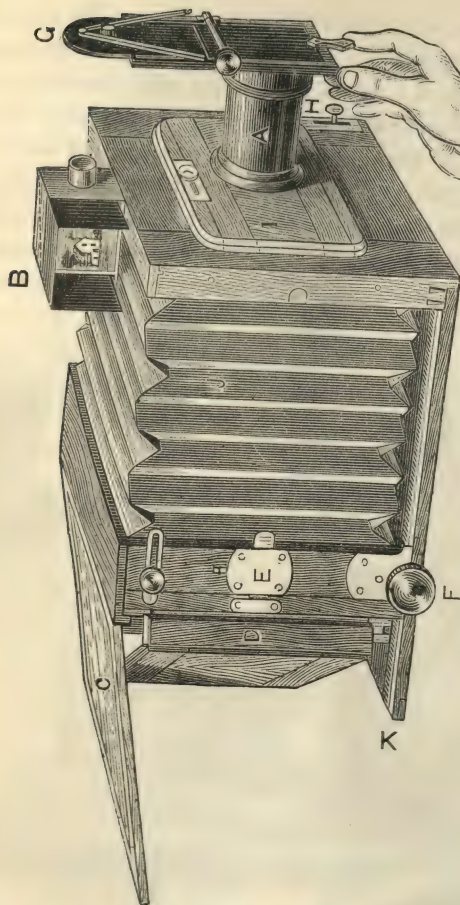


Fig. 2.—The Camera with “Ready” Finder and Drop Shutter.

### THE BEGINNER'S GUIDE TO PARTS OF CAMERA.

- |                                              |                                |
|----------------------------------------------|--------------------------------|
| A. Lens.                                     | F. Rack work for focussing.    |
| B. Ready finder.                             | G. Instantaneous shutter.      |
| C. Focussing screen of camera.               | H. Vertical front of camera.   |
| D. Shutter of dark slide drawn for exposure. | I. Horizontal front of camera. |
| E. Swing back.                               | J. Bellows of camera.          |
|                                              | K. Tail-board of camera.       |



is the shape of an umbrella, and packs up like one into a very small compass. Those who attempt photography in high latitudes, at a season of the year when the sun never sets, will find some arrangement of this kind almost indispensable. In Norway, for instance, during the summer months, a dark room is almost an impossible thing to secure. With the "Eclipse" tent the tourist carries his own dark room with him. Here is an illustration of the manner in which it is used, the pail above representing the necessary water-supply.

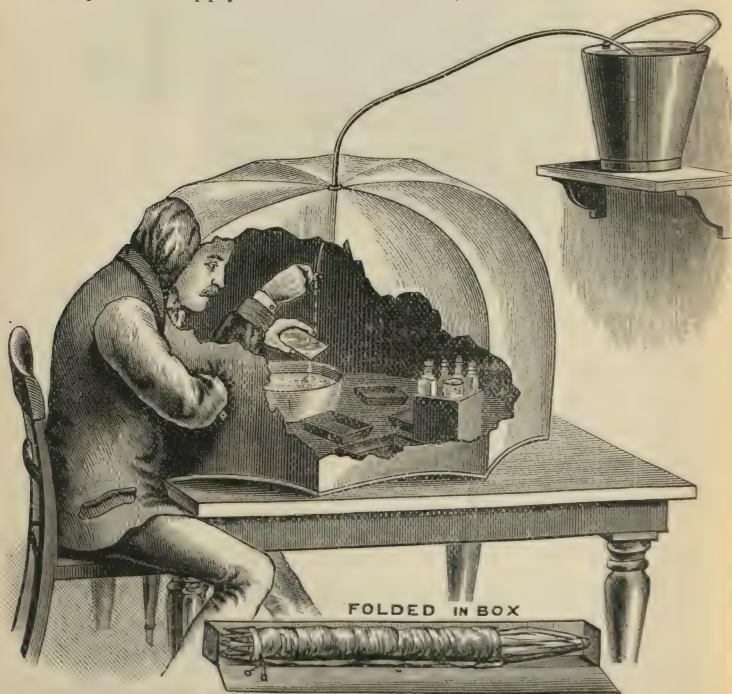


Fig. 3.—The "Eclipse" Tent.

## II.—The Dark Room.

IT is necessary that the photographer should have at home a dark room, in which various operations are conducted connected with the art. If a room can be set apart for this purpose, so much the better; and a very small room or spacious cupboard is quite sufficient for the requirements of the amateur. But any room can be rendered serviceable, if the precaution be taken to shut out white light, and to replace it by red light, which latter exerts no action upon the sensitive chemicals employed. A light frame-work of wood should be made to fit into the window of the room, this frame being covered with two thicknesses of the material known as ruby fabric. A still simpler plan, if a cupboard or room without a window is the only place available, is to employ a red lamp like the one shown in the margin. A water-tap with a basin and waste-pipe is a desideratum, but if these are not accessible, a hand-basin and can of water will suffice.

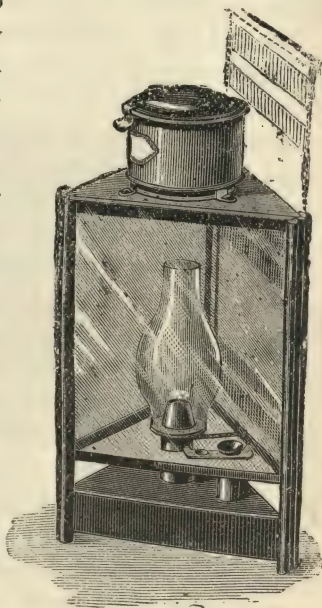


Fig. 4.—Dark Room Lantern.

### III.—Trial Exposure of Plates.

WE now come to the actual commencement of operations, viz., the first attempt of the beginner to take a photograph.

The first matter of importance is to select the subject to be photographed, and here we would advise a simple subject, such as the exterior of a house or a view from a window. Care must be taken that the light is behind or at the side of the camera and falling directly upon the subject: on no account must the camera be placed so that the sun shines into the lens. Having fixed the camera upon the tripod stand, throw partly over the instrument and partly over the head the focussing cloth: this will enable the image to be seen upon the ground glass at the back of the camera.

The image as thus seen is deceptive. It is inverted, for the rays of light in passing through a lens cross one another. The beginner will find little difficulty on this score, for his eyes will soon become accustomed to it. All objects are portrayed in their natural colours on the ground-glass screen of the camera, and look very different when translated into black and white in the subsequent photograph. The beginner must be cautioned not to choose subjects for photographing which depend for their beauty more upon the contrast of colours which they exhibit than upon form. This is especially true of wide



expanses of open, flat country, which look beautiful enough on the focussing screen, but usually make disappointing photographs.

#### HOW TO FOCUS.

To adjust the focus, use the screw which is generally at the back or side of the instrument, turning it backwards or forwards until the image is quite sharp upon the ground glass. It is best to select some prominent object in the centre of the picture, and to endeavour to get that as sharply defined upon the ground-glass screen as possible. This focusing operation should be performed with the

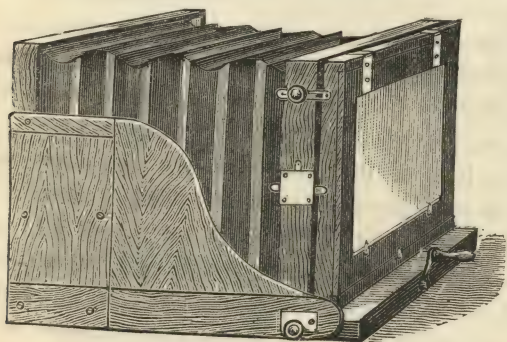


Fig. 5.—The Camera.

full aperture of the lens, *i.e.*, with no stop or diaphragm inserted in the slit in the brass mount of the lens. But, when once a satisfactory focus has been obtained, the operator should insert one of these stops, which will not only increase the sharpness of definition, but will correct a certain tendency to indistinctness at the edges of the picture. The smaller the stop used, the longer must the exposure be; and the beginner cannot do better than

work with a medium-sized stop, and use no other. By this means he will be able, after some little practice, to produce a picture with some certainty that it has received the correct exposure.

#### CHARGING THE DARK SLIDE.

Now proceed to the dark room, and by aid of the ruby light open a box of plates. Upon carefully examining them it will be noticed that one side is coated with a thin white film, the opposite side being plain glass. Open the double dark slide and place one plate inside, film downwards, covering it with a piece of blackened tin, on top of which place another plate, face uppermost ; thus the plates will be back to back, with the blackened tin inserted between them, after which the slides must be carefully shut, and the box containing the plates closed. There will always be a partition between the plates whatever the construction of the dark slide may be. During the filling of the slides very great care must be taken that no white light gets to the plates, as the sudden opening of the dark room door, or, in fact, the slightest admission of daylight, would effectually spoil the whole batch, rendering them perfectly useless. The result would be what is technically known as "fog."

Tourists have to change their dark slides at night, generally in their hotel bedroom. With a portable red lamp, which will fold up flat for packing, this necessary operation represents no difficulty whatever.

#### PREPARATIONS FOR EXPOSURE.

Shut the plate-box and proceed to the camera, and substitute the double slide for the ground glass, and, capping

the lens so that all light is excluded, draw the shutter of the dark slide, keeping it carefully covered with the focussing-cloth. Everything is now ready,—good light, picture sharp, cap on lens, stop in lens, slide in camera and opened; all this done, nothing now remains but to uncap the lens for the time necessary to secure a photograph.

## TIME OF EXPOSURE.

No hard-and-fast rule can be laid down as an absolute guarantee of certain and correct exposure, but with ordinary conditions about two seconds should be quite sufficient. The exposure is made by gently removing the cap from the lens for the space of time already mentioned, *care being taken in removing the cap not to jerk the camera*. Having yet another plate, it can be exposed (after replacing the cap) by taking the slide out of the camera and reversing it. It is a good plan for the beginner to make, say, four exposures on one plate, thus:—Let him first of all focus a picture. Draw the shutter out one-fourth of its length, and remove the cap from the lens for one second, replace cap, and draw out the shutter one-half, and give two seconds, and so on for three-quarters and the whole plate. This picture, with its four different degrees of density, will form a standard guide for future work. We would here note a great advantage that dry plates possess over the old “wet process,” viz., their keeping qualities, it not being at all necessary to *develop them upon the spot*, as they will be quite as good if left untouched (but carefully preserved from the light and damp) for months. But if the beginner avails himself of this privilege, it will be advisable to use a note-book which is so arranged that a correct record can



be kept of all exposures, and memoranda made of conditions of light, &c. This is highly necessary, as, supposing the student to have three dozen plates, and the first should prove, when developed, to be under or over exposed, he can by reference to his note-book see if the remainder are likely to be the same, and if such should be the case, he may, by judicious modification of the developer, make his plates perfect.

Gelatine plates are now sold of various degrees of rapidity. The beginner should perfect himself in the use of slow ones, or, at any rate, he should use those of a moderate degree of rapidity, and afterwards he can employ those used for instantaneous effects, and with which a moving train and even a flash of forked lightning can be secured in the camera.

#### IV.—Development.

THE next process is the development. Many amateurs are under the impression that this is a most tedious and difficult operation, but by carefully following the rules enumerated below success is certain.

There are many formulæ for developing, but we append one which will be found to give results equal to any, and which possesses the advantage of extreme simplicity. Make as follows :—

##### No. 1.

Liquor Ammonia 880°	...	...	1½ oz.
Bromide of Potassium	...	...	8 drachms
Water	...	...	6½ oz.

## No. 2.

Water ..... 8 oz.  
 Citric Acid... .. 2 drachms.  
 When dissolved add Pyrogallic Acid 1 oz.

The above are stock solutions, and should be labelled Nos. 1 and 2.

Now obtain two 16-oz. bottles, take one ounce of No. 1 stock solution and put it into one of the bottles, and fill it up with water, labelling it "A," and do the same with No. 2, calling it "B." \*

## PREPARATIONS FOR DEVELOPMENT.

We will suppose it is an ordinary "half-plate" we wish to develop. Having prepared the solutions as above, we take a graduated measure, and putting equal parts of A and B (one ounce of each) into it, should next open our slide, and placing the plate film uppermost in an ebonite tray, pour quickly over it the solution from the measure, taking care that it flows all over at once.



Fig. 6.—Graduated Measure.



Fig. 7.—Developing Tray.

Be careful to scan the surface of the wetted plate for air-bubbles, which, if allowed to remain, will turn into white,

\* Developers of great excellence are sold by the Company, ready for use.

clear spots on the negative. A broad camel's hair brush should be kept within reach to remove such unwelcome intruders. Care must be taken, too, *to wash out every vessel* used for development before a fresh plate is operated upon.

#### TIME OF DEVELOPMENT.

If properly exposed, the picture should appear in about 10 to 15 seconds, but the development should be continued for the space of from four to five minutes. It is as well to keep the solution, while on the plate, constantly moving, to prevent unequal action and any decomposed particles from settling on the plate and causing spots. The negative is properly and sufficiently developed when those parts of the picture which were white in the original are almost perfectly opaque in the negative,—the darkest shadows remaining yellowish and unaltered under the influence of the developing solution, and the gradations of tone fully preserved.

The development of a plate which has been properly exposed is a much more simple matter than would appear by the description,—indeed, it is almost difficult to spoil utterly a picture which has been nicely timed ; on the other hand, any amount of verbal instruction would but imperfectly prepare the amateur for meeting and overcoming the difficulties of over and under-exposed negatives : still, there are one or two facts the knowledge of which, with a little practice and a few failures, will be of great service to him.

Negatives which have been very much under-exposed are useless ; the contrast of light and shade is too violent. In the vain attempt to bring detail into the shadows, the



lights are, as it were, clotted, and the longer the development the greater the failure; but when the time of exposure has not been much too short, the picture may often be saved by taking as much again of A, and making it up to its usual quantity with B. Thus, if three ounces of developer were wanted, it would be composed of two ounces of A and one ounce of B.

A negative which has been greatly over-exposed bursts into sight at once on the developing solution being applied, and the image gets fogged all over immediately, and there is very little contrast. But do not give the plate time to go so far as this. Directly it is seen that the image is showing too quickly wash off the developer without delay and rinse with clean water. Now recommence developing, but alter the proportions of A and B. Take only one ounce of A to about two ounces of B. Of course these are only approximate quantities, but the student will be surprised when he finds how quickly he can perceive the proper proportions to use.\*

After development the plate should be well washed (for two minutes) and then immersed in

#### ALUM SOLUTION,

consisting of:—

Alum	...	...	...	...	...	2 OZ.
Water	...	...	...	...	...	20 OZ.

\* In cases where large numbers of negatives have to be developed, it is best to cover the tap with a piece of flannel to prevent the possibility of the plate being injured by accidental contact with the metal.

Let it remain in this bath for a minute or two, after which take it out and wash it *well*, previously to putting it into the "fixing" or "clearing" solution. This is made by adding

Hyposulphite of Soda	...	...	...	5 oz.
To Water	...	...	...	20 oz.

#### FIXING OR CLEARING THE NEGATIVE.

It will be noticed previously to immersion in this solution that the back of the plate is quite white, very little of the picture being perceptible when held up to the ruby light. The object of this bath is to clear away all the whiteness (bromide of silver) from the film, and to leave the picture only on the plate, sharp, clear, and distinct. The plate should not be left in this solution for less than ten minutes, and when taken out should be *washed under a tap most thoroughly*. If the washing be not thorough, the negative will run a risk of being destroyed. After this it can be laid in a deep dish and treated to several changes of water at intervals of about half an hour (this can be done in daylight), and placed upon a shelf or plate-rack to dry.

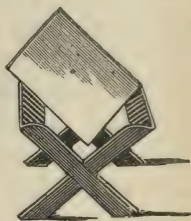


Fig. 8.—Plate Rack.

#### HOW TO FACILITATE DRYING.

If a negative is required in a hurry, it may, after well washing, be immersed for five minutes in "methylated spirits," after which it will dry very quickly.

It should here be noted that it is best to pour out fresh

A and B solution into the glass measure for each plate, but the alum and hyposulphite baths can be used until exhausted.

The method of development which we have just described is known as the alkaline method, and is that most commonly adopted by English photographers; so that we may feel quite sure it possesses many merits. This alkaline developer will sometimes—if development is unduly prolonged—leave a yellowness on the negative, which will greatly interfere with its printing capabilities later on. This can be removed with great ease by the immersion of the plate for a few minutes in the following clearing solution :—

Alum	...	...	...	...	...	2 OZ.
Citric Acid	...	...	...	...	...	1 OZ.
Water	...	...	...	...	...	10 OZ.

Continental photographers almost universally employ quite a different system of development, and with it they obtain very fine results. The amateur will do well to try it, for it possesses many undoubted advantages, among which we may cite the following :—

1. Several negatives can be developed one after another with the same solution, but it will get slower and slower in its action, until it gets quite inert, and can be then thrown away.
2. It will not stain the fingers.
3. Negatives so developed will print much quicker than those treated by the alkaline method. Here is the formula :—

A. Saturated Solution of Oxalate of Potass ... 2 oz.



This should be made with boiling water, and well stirred until the crystals are dissolved. The right proportions are—Oxalate of Potash, 1 lb.; Boiling Water, 1 quart. When cold it is ready for use.

B. Protosulphate of Iron (in powder) ... 1 drachm.

Tartaric Acid ... .. 2 grains.

Add B to A (be sure not to reverse the order), and stir. When the sediment has settled to the bottom of the vessel, the liquid can be poured into the developing dish. Before the plates are placed in the dish, they should previously be soaked for a minute in plain water. The development will, if the plate has been properly exposed, progress gradually, and the action should not be stopped until the negative is well blackened. Now immerse in the alum bath, then in the fixing bath; wash as already directed, and allow to dry spontaneously. On no account attempt to dry by heat, or the gelatine will most surely melt off the glass.

Although we have given two standard methods of development, let it be borne in mind that the maker of plates may be presumed to know best which developer will best suit them. His advice should, therefore, be listened to in this matter.

## Failures

### AND THEIR REMEDIES.

1. LACK OF CONTRAST IN THE NEGATIVE.--Cause: over-exposure. The remedy is obvious, viz., expose less, but if the picture flashes up at once, add a little more of B to the developer.

2. THINNESS OF THE IMAGE may arise from two causes :  
1st, too short a time in the developer ; 2nd, over-exposure.
3. TOO DENSE AN IMAGE.—Cause : too long an immersion in the developer. Remedy : soak plate for 24 hours in Alum Solution.
4. THE FILM LEAVES THE EDGES OF PLATES. Technically called “Frilling,” generally arises in hot weather. Remedy : insertion in Alum Solution, 1 oz. to 10 oz. water, before and after fixing.
5. YELLOW OR FOGGY APPEARANCE OF NEGATIVE.—Caused by deposit or staining of the film, easily removed by placing it in the Solution of Alum and Citric Acid, *see* p. 27 (for short time only, after fixing); to be well washed before and after.
6. POWDERY DEPOSIT UPON FILM WHEN DRY.—Not properly washed. Hyposulphite of Soda deposit. The remedy is obvious.
7. In hot climates, and even in this country in very hot weather, the film will sometimes show a tendency to bubble up and separate from the glass. This is an aggravated form of frilling, which will generally yield to Alum. If not, use a 10 per cent. solution of Chrome Alum, which is stronger in its action.
8. Minute spots, or pinholes, on the negative may be traced to dust on the plates. Remedy : brush each plate with a flat camel-hair brush before its insertion in the dark slide.

9. Larger *round* spots are due to air-bubbles during development. The remedy has been already noted on a former page.

10. A general yellowness of the negative (this never appears when the Ferrous-oxalate method is employed for development), due often to forcing out of details during development and consequent prolonging of that operation, will generally disappear on application of the following clearing solution—after fixing and washing:—

Alum (saturated solution) ... ..  $\frac{1}{2}$  pint.

Hydrochloric Acid ... ..  $\frac{1}{2}$  oz.

11. If the “fog” is general it is caused by extraneous light, either having affected the plate through leakage in camera or slide, or whilst changing or developing.

## V.—Intensifying.

IT may sometimes occur that the negative is too thin for printing, *i.e.*, when the plate is held up to the light the image is exceedingly faint.

This may arise from various causes; too little or too much exposure will both produce this effect, or an insufficiently developed plate will result in a like want of density. Hence it is necessary to intensify or strengthen the image



by making it denser and more suitable for printing. This can easily be done in the following way:—

Prepare a solution of

Sal Ammoniac ...	...	...	1 OZ.
*Bichloride of Mercury ...	...	...	1 OZ.
Water ...	...	...	10 OZ.

and having well washed the plate, immerse it in a quantity of this mixture. A change will gradually take place in the colour of the film, it slowly bleaching or whitening all over; directly this is universal (which can be ascertained by looking at the back) it should be subjected to a most vigorous washing. This done, add to 5 oz. of water about half a drachm of liquor ammonia, and pour it quickly and evenly over the plate, when the whiteness will gradually disappear, and a brown tinge will take its place. When this is universal the process is finished, excepting, of course, a few minutes' washing. It should be observed that upon the quantity of ammonia put into the water depends the density of the image—the more ammonia the denser the image,—but the above quantity is about correct, and should be sufficient. The plate is once more dried prior to varnishing. A negative can be intensified if necessary long after it has been fixed and dried.

*\*N.B.—We may add that Bichloride of Mercury is a most deadly poison.*

## VI.—Varnishing.

THE plate being quite dry, it should receive further protection from the air, and not be printed from until varnished. A great deal depends upon the quality of the varnish used, some samples affording little or no permanent protection to the picture. The Company prepare a special kind, which they can recommend. It *is* possible to print without varnishing the negative, but a great risk is run of the delicate film getting scratched and the negative ruined.

### WARMING THE PLATE.

A little practice will enable the beginner to varnish his plate successfully. Take the plate in the right hand, and hold it before the fire until it is quite warm to the hand.

### HOW TO POUR THE VARNISH.

Holding the plate between the thumb and finger of the left hand by the bottom corner, and taking the varnish bottle in the right hand, pour upon the centre of the plate (film side) a quantity of the varnish sufficient to form a pool on the plate of about one-third its area; now gently flow it to the top right-hand corner and thence round

the plate, finally pouring the superfluous varnish back into the bottle, and gently rocking the plate backwards and forwards to prevent the varnish settling in lines or streaks upon the plate. Again hold it before the fire until the spirit has evaporated from the varnish, and, finally, place the plate upon a shelf to harden for an hour or two. Care should be taken that no dust settles on the plate during varnishing; it will also be found beneficial to dust the plates, before varnishing, with a camel's hair brush.

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## VII.—Printing.

WE will suppose the amateur to have successfully taken, developed, dried (and if necessary intensified), and varnished the negative.

### APPEARANCE OF A NEGATIVE.

The worker will notice that those parts of the picture which reflected most light (as, for instance, a white-washed wall) are densest or most opaque in the negative, while those which were in deep shadow, and consequently darkest (such as the shadow underneath a tree), are most transparent. This must necessarily be reversed to be true to nature; that is, white must be white and black black, while



the intermediate shades or half-tones are in due proportion. This effect we obtain by printing. The following are the

#### MATERIALS REQUIRED.

A few Porcelain Dishes.

A Printing Frame.

Sensitised Paper.

Chloride of Gold.

Acetate of Soda.

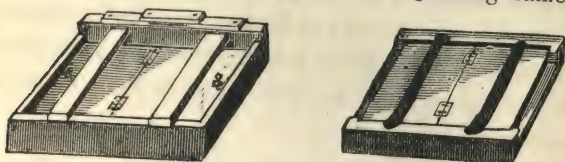
Hyposulphite of Soda.

The printing operations are from first to last rather tedious, and necessarily occupy some time ; and, although, for the sake of clearness, we shall in the following directions presume that only one or two pictures are being treated, in practice no one would think of undertaking all the trouble entailed unless two or three dozen were required. Indeed, from the nature of the work, as will be presently seen, the larger number are as easily done as the smaller, and with no greater expenditure of chemicals. The operations required are four in number, and these we shall treat in detail, namely :—

1. Exposure to Light in the Printing Frame.
2. Toning the resulting Print.
3. Fixing the Print.
4. Washing the finished Pictures.

## PUTTING NEGATIVE IN FRAME.

Proceed to a room not too brilliantly lighted, and, pulling down the blind, take the sheet of sensitised paper, and cutting it to the requisite size,\* open the printing frame by



Figs. 9 and 10.—Printing Frames.

releasing the brass springs at the back, and taking the hinged backboard out, place the negative in the frame, allowing it to rest evenly on the rebate provided for it, film or varnish side uppermost.

Upon opening the box which contains the sensitive paper, it will be noticed that one side of the paper is shiny. Place that side downwards, and in direct contact with the film or varnished side of the negative.

A new portable printing-frame has been introduced by the Company. It possesses no outer frame, and, therefore, is far more compact than the older pattern. (See Fig. 11, next page.)

Putting two thicknesses of perfectly dry blotting-paper on top of the sensitised paper to act as padding, replace the backboard and fasten the spring, turn the glass side up to the light to print, not forgetting to clean the face of the negative to insure even printing. It is best *not* to print in direct sunlight unless the negative is very dense, but in

\* The Stereoscopic Company are now selling this paper cut to all sizes, ready for use.

ordinary reflected daylight. It is as well, too, not to attempt to print a batch of pictures unless the weather be fine. In dull weather the work is most tedious and disappointing. The sensitive paper, having been cut in the first instance to the size of the negative, may be placed in a dark box or drawer; and, as each picture is printed, it must be removed from the printing-frame and put aside in the same place until the whole batch is ready for further treatment.

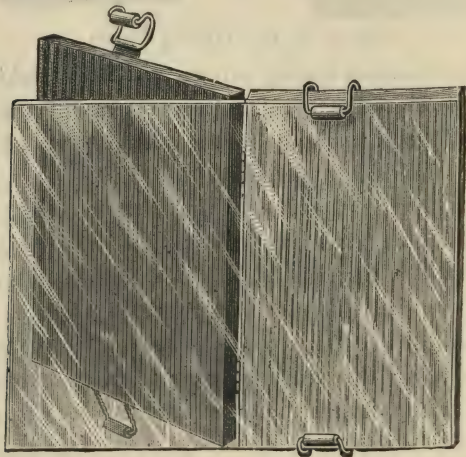


Fig. 11.—New Portable Printing Frame.

The printing frame is so made that one side of the hinged back can be turned up during an examination of the print, whilst the other side is held firmly in contact with the negative. The gradual darkening of the image should be allowed to go on until the picture is a shade darker than it is intended to be when finished, for the subsequent



processes rob it of a good deal of its force. We have already seen that a dense negative will want a strong light to affect the sensitive paper beneath it. A thin one, on the other hand, must have a weak light, such as that afforded in a room at some feet from a window. In this way a poor negative can be made sometimes to yield a decent print.\*

### VIII.—Toning.

WE now come to an operation that requires a certain amount of care and judgment, but careful adherence to the directions appended will ensure success.

#### THE USE OF TONING BATH.

The print when taken from the printing frame is still sensitive to light, and consequently, if exposed, will darken and become useless. To destroy this sensitiveness, and to alter it from its present brick-red colour to a much more pleasing hue, and also to make it permanent, is the work of the toning and fixing baths. The materials required are as follows:—

1. Chloride of Gold (sold in glass tubes).
2. Acetate of Soda or Borax.
3. Four Porcelain Dishes.
4. Hyposulphite of Soda.

\* The directors of the L. S. & P. Co. (Limited) will at all times be happy to permit *bonâ-fide* amateurs to visit their printing works, which is probably the largest photographic factory in the world.

Take the tube of gold and put it into a 2-oz. bottle and knock it against the sides until broken, after which fill it with water.

#### COMPOSITION OF "TONING BATHS."

There are various toning baths, most of them possessing advantages of their own, but a good bath ready for use directly after mixing can be made with—

Borax (powdered) ... .. 1 OZ.

Water (hot) ... .. 20 OZ.

When *quite* cold, add Gold (in solution), 2 drachms.

With the above formula any variety of tone may be obtained, from dark brown to black; but as this bath does not possess special keeping qualities, some may prefer the following :—

#### DURABLE "TONING BATH."

Acetate of Soda ... .. 1 drachm.

Chloride of Gold (in solution) ... 2 drachms.

Water ... .. 16 oz.

This must be mixed twenty-four hours prior to use, and is the better for being mixed three or four days beforehand. It will keep and tone well. The above formulæ are the most popular, both with professionals and amateurs.

BATH FOR BROWN TONES.

Many people prefer pictures of a warm brown tone, and these can be obtained by using a bath composed of—

Bicarbonate of Soda ...	...	...	1 scruple.
Water ...	...	...	10 oz.
Chloride of Gold (in solution) ...	...	...	1 drachm.

This bath, though a capital one for yielding warm brown tones, is not capable of being kept any length of time; therefore it is not advisable to make up a great quantity.

The student had better mix one of these baths and label it "Toning Bath," after which take

Hyposulphite of Soda ...	...	...	3 oz.
Water ...	...	...	20 oz.
Strong Ammonia ...	...	...	2 drops.

and label it "Fixing Solution for Prints."

SOAKING THE PRINTS.

Previously to toning the prints they must be washed to relieve them of their free silver. (This salt will make itself evident by causing the washing water to assume a milky appearance.) For this purpose take two porcelain dishes, and filling them with water, immerse the prints into No. 1 dish; leave them for a few minutes to soak, after which transfer them to dish No. 2, and refilling No. 1 with fresh water, replace them. They are now ready for the "toning

bath," the use of which is to turn them from the objectionable red tinge to a chocolate or dark purple, according to the taste of the student.

The best way to work is to place before the operator three clean dishes. Into the centre one pour the toning bath; that on the left hand will contain the prints; while that on the right will be filled with clean water. Take the prints separately and place them in the toning bath, moving them about constantly to ensure their toning evenly. Do not place more than two or three in at a time.

#### HOW TO OBTAIN THE CORRECT TONE.

Under the action of the toning bath the prints will gradually lose their disagreeable brick-red colour, and will assume the ordinary appearance of photographs. It is in this operation that many fail, it being a simple matter to change the colour of the prints, but another thing altogether to secure a rich dark tone. In the after-operation of "fixing" they lose a little of their warmth of colour, and, therefore, as in the printing operation, they must be a little overdone. When the prints have arrived at this stage, take them out and place them in the dish of clean water. Before meddling with the "fixing bath," carefully decant the toning solution back into the bottle, and when about to use it next time add another drachm of gold. Theoretically, one grain of gold should suffice to tone an entire sheet of sensitive paper.



## OBJECT OF THE FIXING BATH.

Although the prints are not nearly so sensitive as before immersion in the toning bath, still they are liable to discolouration if left exposed to too strong a light; hence, to make them insensitive and also to clear them, we place each separately in the "fixing" or hyposulphite bath, the formula for which we have just quoted.

They should remain in this solution for about ten to fifteen minutes. On no account should they be left together in a mass, or the after-result will be yellow stains where the solution has failed to act.

The student need not be greatly alarmed at the change of tone which takes place directly they are immersed in the fixing bath, as when dry they will regain their proper colour.

## WASHING THE PRINTS.

Having successfully toned and fixed the prints, nothing now remains but to thoroughly wash them. A great deal has been said and written on the subject of the fading of photographs; it has been clearly proved that, under certain circumstances, they *do* fade, and it has been equally clearly shown that, by a proper understanding of the causes, and common attention to the requisite precautions, fading need never occur. The causes of fading are insufficient washing and improper mounting.

The object of washing the prints is to insure the absence of the slightest trace of the hyposulphite of soda, which,

although very soluble in water, is most persistent in its adherence to the paper. It is not sufficient simply to immerse them. The water in which the prints are placed must be changed at frequent intervals.

For washing on a large scale many clever appliances have been devised ; but these are quite out of the question for amateur use, when perhaps only four or five dozen pictures are printed on each separate occasion. But when all is said and done, nothing is more effectual than careful hand-washing, and the method of procedure which we recommend is as follows :—Procure two large earthenware pans, such as are used in dairies, and fill each with clean water. Now take the prints one by one from the fixing bath, and place them in pan No. 1 ; when all are thus transferred, let them remain for two minutes, and pour off all the water, keeping the hand on the prints to prevent them running away too. The paper pictures will now be lying in a mass at the bottom of the pan, which should be raised on edge in a sink, so that all adherent water will run off them. In five minutes time fill up the vessel once more with fresh water, allow the prints to soak for five minutes, and transfer one by one to pan No. 2. In, say, fifteen minutes, the same operation may be repeated. After about one dozen such alternate soakings and washings, the prints may be considered free from the fixing salt.

---

## IX.—Trimming the Print.

**T**HIS is such a simple matter that it scarcely merits or needs much explanation. It is best done before toning, but can be left until just before mounting if preferred.

### IMPLEMENTS WANTED.

1. Glass Cutting-shape, the size of print.
2. A sharp Knife.
3. A piece of Plate Glass upon which to trim the prints.

Take the print and lay it face uppermost upon the glass plate, and above it place the cutting-shape, adjusting it so that the rough edges or parts not wanted are not covered by the glass. With the left hand upon the top of the cutting-shape to prevent it moving, take the knife in the right hand, and run it round the edge of the glass cutting-shape, putting sufficient pressure upon it to cut off the parts not wanted. This can be done in diffused daylight or gaslight.

## X.—Drying, Mounting, and Finishing.

### DRYING.

TO dry the prints, take two sheets of blotting paper (best quality) and, laying the prints down upon one sheet, cover them with the other, and leave them until dry. The prints treated thus will not cockle in the drying manner that spontaneously-dried prints will do. But probably most of our readers will desire to mount copies from their negatives so that they shall be suitable for framing, or for presentation to their friends. This is a simple matter if carefully attended to.

### THE MOUNTANT.

In the first place, do not dry the prints, but take a sheet of plate glass and lay the prints face downwards upon it, placing them in rows and layers one upon another; when all are on the glass, take a clean towel and gently press all the moisture out of them; they will then lie flat and even, and are ready for mounting.

The best mountant is "Glenfield Starch," made rather thicker than that used by the laundress. It possesses the advantages of great cleanliness and easy application to the back of the photograph. Apply the starch evenly all over the back of the print, and, placing the cardboard in front of you, lay the photograph on the top in its true position; now put over it a sheet of clean paper, and gently rub the hand over the surface of the paper; when this is done it



will be noticed that the mount and print are in perfect contact. They may now be allowed to dry spontaneously. Should the prints be allowed to dry before being mounted, a more convenient medium than starch will be found in the following:—Soak half an ounce of hard gelatine in 5 oz. of water until it is quite soft. Place the vessel in hot water until the softened gelatine becomes perfectly liquid. Now stir in 2 oz. of methylated spirit. This mountant should be kept corked in a wide-mouthed bottle. When required for use, the bottle must be placed in hot water until the gelatine melts. A good stiff brush is the best thing to use in applying it to the prints to be mounted.

#### FINISHING THE PRINT.

Many amateurs wonder how it is that their photographs do not possess that high finish which is seen upon the prints which come from a professional photographer's studio; but theirs may be equally well glazed by using a burnishing machine as shown in the sketch below; but, as

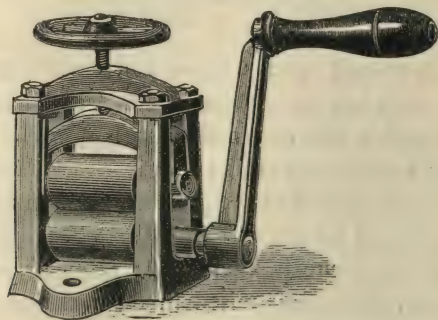


Fig. 12.—Burnishing Machine.

these machines are somewhat costly, we should not advise the amateur to invest in one of them, as arrangements can easily be made with a photographic firm for rolling prints.

There is, however, another kind of small press which is of great service to amateurs who wish to give their portraits as professional an appearance as possible. This is the cameo press here illustrated. It consists of a strong iron frame furnished with a powerful screw, by which great pressure

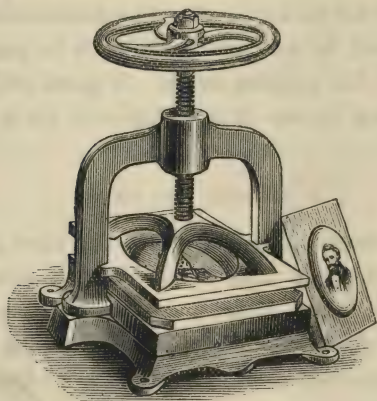


Fig. 13.—Cameo Press.

can be exerted upon a loose iron cover placed below it. This cover has underneath it a bed of thick indiarubber, upon which the mounted print is placed. Above this comes a thick plate of zinc with an oval orifice in it. This is carefully centred on the portrait, the iron cover is placed above it and the screw is brought to bear upon the whole. When the picture is, after a few moments, released from the press, its centre is raised in an oval dome, giving it a very handsome appearance. The effect can be improved

by masking the portrait immediately after printing with an oval mask corresponding in size with the press oval. While thus protected the picture can be once more exposed in the printing frame, when all the parts outside the oval can be printed as many shades darker as may be required. This treatment is adapted only to portraits which have been vignetted. A vignetting glass for these portraits can be purchased at a very trifling expense.

### Table of Procedure.

- |                                                   |                        |
|---------------------------------------------------|------------------------|
| <b>A.</b> Focus the picture.                      | <b>L.</b> Wash well    |
| <b>B.</b> Insert plate in slide.                  | <b>M.</b> Dry.         |
| <b>C.</b> Expose by removing cap.                 | <b>N.</b> Varnish.     |
| <b>D.</b> Develop according to instruction.       | <b>O.</b> Print.       |
| <b>E.</b> Wash.                                   | <b>P.</b> Trim.        |
| <b>F.</b> Put plate in alum solution.             | <b>Q.</b> Soak prints. |
| <b>G.</b> Wash well.                              | <b>R.</b> Tone do.     |
| <b>H.</b> Put plate in Hyposulphite of Soda bath. | <b>S.</b> Wash do.     |
| <b>I.</b> Wash well.                              | <b>T.</b> Fix do.      |
| <b>J.</b> Dry.                                    | <b>U.</b> Wash well.   |
| <b>K.</b> Intensify. (If necessary.)              | <b>V.</b> Mount.       |
|                                                   | <b>W.</b> Dry.         |
|                                                   | <b>X.</b> Finish.      |

## Sizes of Photographic Glass.

	INCHES.
$\frac{1}{4}$ plate ... ..	4 $\frac{1}{4}$ by 3 $\frac{1}{4}$
$\frac{1}{3}$ „ ... ..	5 „ 4
$\frac{1}{2}$ „ ... ..	6 $\frac{1}{2}$ „ 4 $\frac{3}{4}$
$\frac{1}{1}$ or whole plate ... ..	8 $\frac{1}{2}$ „ 6 $\frac{1}{2}$
Stereoscopic ... ..	6 $\frac{3}{4}$ „ 3 $\frac{1}{4}$

Beyond the  $\frac{1}{1}$  the sizes are denoted by the dimensions only, as 10 by 8, 12 by 10, &c.

## APOTHECARIES' WEIGHT.

	TROY.
20 Grains = 1 Scruple =	20 Grains.
3 Scruples = 1 Drachm =	60 „
8 Drachms = 1 Ounce =	480 „
12 Ounces = 1 Pound =	5760 „

Apothecaries compound their medicines by this weight, but buy and sell their drugs by avoirdupois.

## APOTHECARIES' FLUID MEASURE.

	MARKED.
60 Minims m = Fluid Drachm	f 5
8 Drachms = 1 Ounce ...	f $\frac{3}{4}$
20 Ounces = 1 Pint ...	f O
8 Pints = 1 Gallon ...	gall.

## AVOIRDUPOIS WEIGHT.

1 Pound = 16 Ounces =	7000 Grains.
1 Ounce =	437 $\frac{1}{2}$ „
1 Drachm =	27 $\frac{1}{8}$ „

## TROY WEIGHT.

24 Grains = 1 Pennyweight =	24 Grains.
20 Pennyweights = 1 Ounce =	480 „
12 Ounces = 1 Pound =	5760 „

This weight is applied to gold, silver, jewels, &c., and is also used in philosophical experiments, though the more convenient decimal divisions of the French gramme are almost universally preferred by scientific chemists of the present time.

In fluid measure an ounce contains 480 minims, both as bought and used.

A pint contains 20 fluid ounces, which, of distilled water at 60° Fahr., is 1 $\frac{1}{4}$  lb.



## PART II.

### For Advanced Students.

**I**T is very desirable that the reader should master the first part of this manual before he attempts to go farther in the work which he has taken up. Indeed, he would to some extent waste his time by perusing the chapters which follow, unless he has so far profited by our former directions as to be able to take a passable picture. The heading of this chapter will tell him that from this time forward we no longer regard him as a beginner, but as one who is familiar enough with the common byways of photography, and is now longing for "fresh fields and pastures new." We will commence the second section of this book with a few remarks concerning

#### PHOTOGRAPHIC LENSES.

The beginner in photography will perhaps imagine that he has only to purchase a camera and lens, and that with that one lens he will be able to take landscapes, portraits, and every other type of picture which he may desire. This is only true in a limited sense. A good modern landscape lens will, with the rapid plates now available, take a presentable portrait; but a portrait lens, made for the purpose, will take a far better one. A portrait lens is, however,

useless for the more general work required by the amateur photographer. A few words, pointing out the difference between the various lenses used, will save the purchaser some little trouble.

The simplest form of all is known as the *single* lens, which is supplied with the cheapest form of apparatus. It really consists of two lenses cemented together, forming an achromatic combination ; that is to say, it does not give those fringes of colour which are seen in a lens consisting of one piece of glass only. The single lens is most valuable for all landscape work ; and although, as we have said, it is supplied with the cheapest apparatus, it must not be despised for that reason. It has many merits. It gives beautiful definition, and has great depth of focus ; besides which, it is by no means slow. But it has the disadvantage of bending straight lines. This is immaterial in a landscape pure and simple ; but it is a serious defect, and one that cannot be tolerated where buildings are concerned. This bending of straight lines is known as "distortion," and is a defect which never occurs in the lens next to be described.

The rapid rectilinear lens, which is supplied with all cameras, except the very cheapest, gives, as its name implies, straight lines. It is, moreover, the most rapid lens made (except the portrait lens), and is therefore suitable for use with the various mechanical shutters now sold for the purpose of taking instantaneous pictures of moving objects, &c. The rectilinear consists of two lenses, each like the single one already described, placed a short distance apart, with their concave surfaces facing one another. If the camera in use will open out far enough, one of the lenses of the rectilinear may be used by itself, as a single lens. This is

often advantageous when the image on the ground-glass is disappointingly small, and circumstances forbid a nearer approach to the object, as in the case of a ship at sea. The single lens will be double the focus of the combination, and will therefore give a far larger image.

But it occasionally happens that the photographer is so placed that he cannot get far enough away from his subject to reduce its image to a sufficiently small compass on the

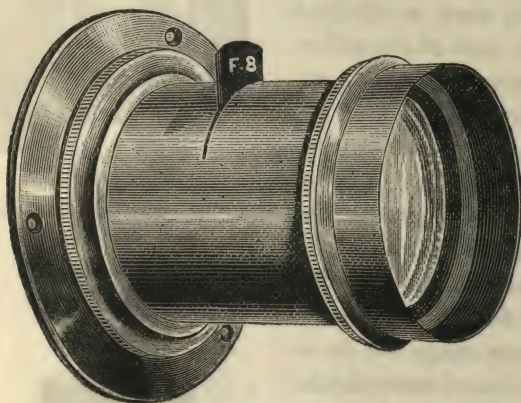


Fig. 14.—Rapid Rectilinear Lens.

ground-glass. Let us take, as a common instance, the case of a church shut in by a churchyard of narrow dimensions, and surrounded, outside that churchyard, by buildings or trees. It is obvious that, in such a case, the camera must be placed within a very short distance of the church. If we use a long focus lens—say one of the glasses of our rectilinear, as recommended in the case of a far-off object—we should probably see on the ground-glass of the camera just so much of the church as its door, the image of which

would pretty well cover the focussing screen. If we use the rectilinear lens in its complete form, without moving the camera from its former position, the image of the door will be reduced to half its size, and we shall get some more of the building on the screen. But still the image is only part of the church, and we want to obtain a general view of the edifice. The only remedy is to employ another lens, of the wide angle, or portable symmetrical type (see fig.). When this is screwed into position (and it may and should be fitted so as to screw into the same flange as the other lens), the image will be so much reduced in size that the whole of it is included within the limits of the ground-glass screen. These remarks will show the advisability of carrying at least two lenses.

The Portrait Lens is made simply and solely for portraiture, and its leading characteristics are sufficiently pointed out in the next chapter.

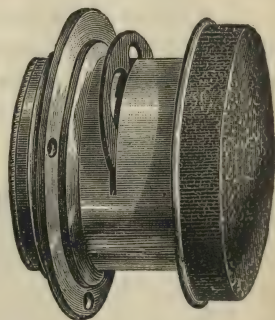


Fig. 15.—Portable Symmetrical Lens.

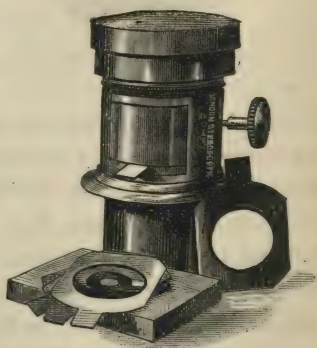


Fig. 16.—Portrait Lens.



## Hints on Portraiture.

THE position of a sitter, while it has generally the least attention paid to it by the amateur, is really the most important matter in photographic portraiture; be the photograph ever so clear, sharp, and well-balanced in light and shade, ever so beautiful in tone, or correct as a likeness, the production is valueless unless it present a graceful and characteristic *pose*. Rules without examples can scarcely afford assistance, and little more can be done, in a work like the present, than to draw the operator's attention to the subject, and to recommend him, if he wish to practise this branch of the art, to study works on art and composition, as applied to portraiture. But let us at once point out that, although we must acknowledge the excellence of amateur photographic work generally, portraiture is the one branch of the art in which the amateur does not distinguish himself. Nor can this be a subject for surprise. It is almost impossible to obtain a good portrait without a photographic studio fitted with all kinds of appliances—and very few amateurs possess this indispensable provision. Hence it is that amateurs' portraits are not generally appreciated by good-natured friends, who, after giving the generous one no end of trouble, will show his *chef-d'œuvre* to their acquaintances with the remark, "He is only an amateur, you know." Still, portraits of a kind can be taken in the open air, or even in an ordinary room, and the following

remarks may be useful to those who wish to try their hands at this most difficult class of work.

A little trouble and expense in procuring a proper background is repaid by the results ; a blanket answers well for a light background, but it is rather too light in some cases ; a grey head or light cap will seem to sink in the picture taken with it. Green baize backgrounds give great relief to the figure, when it is not darkly draped ; but, as a rule, a colour should be chosen which, by contrast, will not impair either the purity of the whites, nor the depth of the shadows in the portrait.

Screens are indispensable to moderate the intensity of the light, and introduce a proper amount of shadow on parts of the figure ; for a portrait taken in the open air, a screen—which may be a dark table-cover thrown over a clothes-horse—should be placed on one side of the sitter, and nearly at right angles with the background ; very delicate shadows can be produced by its aid. Generally, open-air portraits have too much top light, causing heavy shadows in the eyes, and under the nose and chin ; in such cases, the remedy is found by using a dark screen over the head of the sitter, projecting from three to five feet from the top of the background.

When a portrait has to be taken in an ordinary room, it will be found necessary to fix a white or light blue screen in a parallel line with the window, and place the sitter and background in the space between the two, with the light full on the face ; the object of the white screen, which may be a sheet, is to throw back a portion of the light from the window on one side of the sitter's face, which would be too deeply in shadow without some reflected light.

The focus of a portrait lens is very limited in depth ; that is, it will not produce sharp and well-defined images of objects which are at different distances from the camera—if one be in focus, the other will be out. This want of depth increases as the objects are brought nearer to the lens ; hence the necessity for placing the sitter with care, that the hands and face may be nearly on the same plane, and that no part of the arrangement may project towards, or recede very greatly from, the camera ; not only will those parts be indistinct, from being out of focus, but they will also appear much distorted.

The colours of the background and dresses of the sitter greatly influence the time of exposure in the camera : a plate which would require thirty seconds exposure, if the background were very dark and the sitter clad in black, would, in the same light, be over-exposed in twenty seconds with a light ground, and light-coloured drapery. Now a light colour, in a photographic point of view, is not always what is commonly considered a light colour ; yellow is light, but yellows scarcely have any effect on the most sensitive plate, and the result is black ; reds are very nearly as dark ; but blue, even when deep in tone, produces an effect almost identical with white. It being understood that yellow and red draperies develop darker, and blues lighter than they really are, and that these three colours are components of all other colours, it is then easy to judge the effect of any compound colour ; for instance, light green and purple produce medium tints, unless the yellow in the former, and the red in the latter, be in excess, in which cases the results will be dark.

Head-rests are highly useful, when properly managed ;

the most simple form of rest can be screwed on the back of a chair, as shown in the annexed cut, and easily adapted to the position of the sitter; it should be fastened without

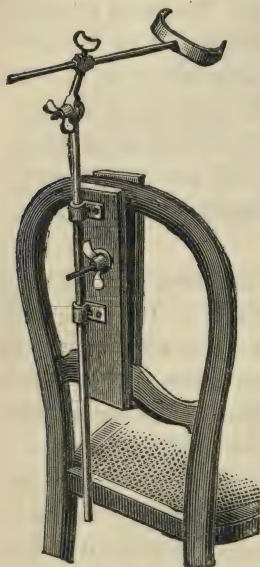


Fig. 17.—Portable Head Rest.

pushing the head forward, or otherwise giving the sitter an awkward and constrained appearance.

The portrait camera should be kept in good condition, dusted out occasionally, and examined as to its being light-tight; the lenses will also require attention, and careful polishing with wash-leather.

The camera, when in use, must be carefully screened from sunlight with the focussing cloth; when the dark frame, carrying the prepared plate, is inserted in the camera, the cloth can be thrown over it, and the slide drawn up under the cloth, to prevent any light finding its way to the plate through the crevice in which the slide moves.

Sunlight falling on the lenses causes fogging on the lower half of the plate: the face of the sitter may be brought out clearly, but the lower part of the figure will be in a mist. To prevent this disagreeable effect, the sun must be screened from the lenses, either by a dark blind above, or an addition in length to the front of the brass tube; a card-board or tin tube, about three inches long and blackened inside,



can be made to fit over the brass, and draw in or out, as far as may be required, to shield the lenses from the glare of light.

## Retouching.

THE art of Retouching a negative is one of those things that can be better understood by a few minutes' practical demonstration than by volumes of written instructions. Still, we shall endeavour to make clear to the tyro its leading features. A landscape or architectural negative should never need retouching, unless, through some neglected bubbles in the developing solution, or from some other cause, transparent spots mar its beauty. These can be filled in with india ink, applied with a fine sable brush. Retouching proper is confined to portrait negatives, and it is executed either before or after varnishing with an H.B. lead pencil.

Professional photographers use a retouching desk upon which to place the negative while under treatment. It consists of an inclined board with an orifice in the centre, in which the negative is held. A sloping board above, hinged to the first one, prevents light being reflected *upon* the surface of the negative; whilst a sheet of white paper placed on the table causes plenty of light to be transmitted *through* it. With a little ingenuity, the amateur will be able to contrive something of the sort for himself.

Neither the gelatine surface nor the varnished surface

will allow pencil markings, unless it be first gently roughened. This is best done with the aid of a little common resin. Powder the resin and rub a very little on the tip of the finger. Now apply this finger to the place where retouching is to be executed (the face and sometimes the hands of a portrait), and rub gently in a circular direction for a minute or two. This operation will give the formerly repellant surface a *tooth* like drawing paper, upon which the pencil will readily leave its mark. The most common facial blemishes which require correction are freckles. These may be really so faint in colour that they pass unnoticed, but the searching eye of the camera will not only find them out, but will depict them as black spots. These in the negative are, of course, reversed ; that is to say, they are clear spots which require to be filled up. The pencil must be sharpened to a fine point, and may be afterwards kept in the same state by occasional application to a piece of fine glass paper by the side of the retoucher's desk. Commence work at the left hand side of the negative and proceed towards the right. To stop up a freckle, approach it with a fine stroke and increase the pressure as you go over it, and end with a fine stroke once more ; cross the line with another, and another formed in the same way, and the blemish will disappear without the manner of its obliteration being detected. Lines in the forehead may be weakened in the same way ; whilst the high lights on the nose and chin, and even the little spark of light in the eyes, can be most effectively strengthened. Aim at putting as little as possible on the work, but take care that that little shall be effective. Touches of light on the hair, and sometimes on the dress,

particularly in the case of linen or lace, are often highly useful. But the beginner will do well to test the effect of his work from time to time, by printing rough proofs of the negative under treatment. He will then see for himself where his faults lie, and he will be able to correct them.

Many little blemishes, which, in spite of every care, will creep into a finished photograph, can be remedied by the operation of "spotting out" after the picture is mounted. This consists in covering any spots with a touch of water-colour, made up of tints which will agree with the general tone of the print.

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## The Photographer's Dark Room.

ALTHOUGH in the first section of this Manual we have touched upon the necessity of a dark room in which the various operations connected with development, &c., must be carried out, we purposely left a more detailed consideration of the subject to this portion of the book. The Company have lately erected some model dark rooms for the free use of amateurs, and the following description of them, taken from the pages of the *Camera* magazine, will be found profitable to the reader:—

"As we briefly indicated in a short paragraph in our last issue, the London Stereoscopic and Photographic Company have recently erected at Regent Street a series of dark rooms for the free use of any amateurs who may feel

inclined to make use of them, whether they be customers or not of the Company which offers them such generous hospitality. As these rooms exhibit in their construction and arrangement much ingenuity, we have thought it well to publish some further account of them, illustrating our remarks with cuts, which we hope will be of help to the reader.

“Space in London is a very different thing to space as applied to the universe generally. The word, when used in reference to the latter, signifies vacancy, but, in connexion with London, it means the reverse, for there is no vacancy to speak of, every inch representing a money value. In no neighbourhood is this more apparent than in fashionable Regent Street, the very heart of the western Metropolis, where these new dark rooms are situated. It has, therefore, taxed the architect greatly to cram into the limited area available all the necessary fixtures which must be found in a well-appointed photographic dark room, and his endeavours have been signally successful. In a space measuring about sixteen feet long by five feet deep, he has contrived to erect four distinct rooms, replete with every convenience which the most exacting worker can require. These rooms are all very much alike, and therefore the description which we will now give of one of them will serve for all.

“At the outside the room has the appearance of a very large cupboard with folding-doors; but within it presents the view shown in Fig. 18. S is the sink, in which lies a wooden grid (not shown in the cut), upon which a plate may be laid after development, while the rose-tap above (L) treats it to a plenteous shower-bath. We may



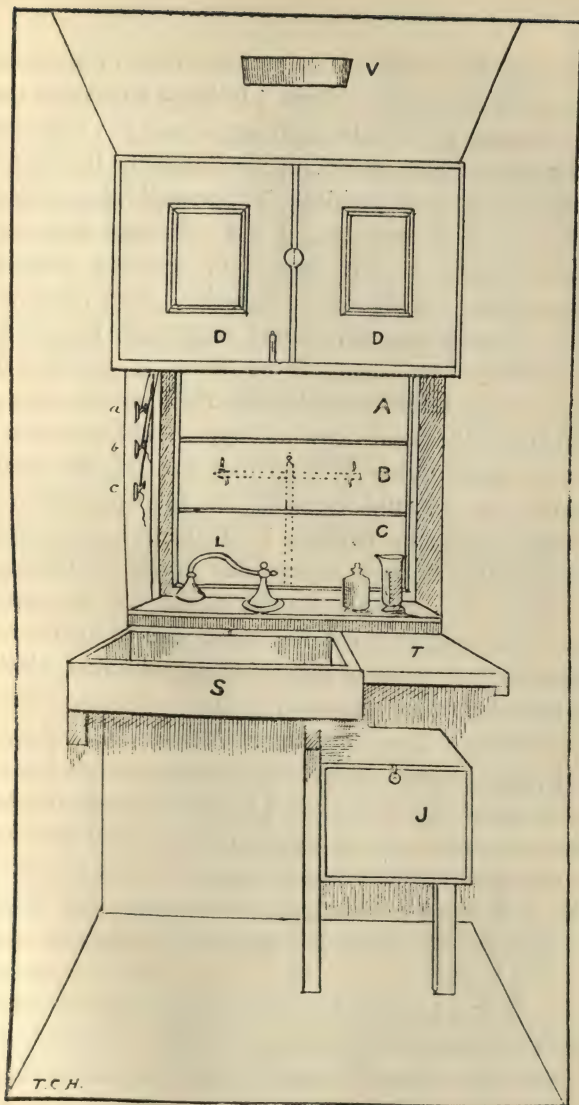


Fig. 18,—The Dark Room,

notice that this tap is on the plan of those in use at the Camera Club, and other places. It is on a movable arm, and the mere act of bringing this arm over the sink turns on the water, which ceases to flow directly the arm is returned to its former position. T is a small ledge or table for the use of the operator. J is a light-tight case, containing divisions for the storage of sensitive plates of different sizes. D D are doors which, when open, will let in a flood of daylight, should white light be wanted. The ordinary illumination of the room is provided for by the window below these doors. This consists, first, of a window of the usual household type. There is then a space of some inches between that and the non-actinic window to be presently described. In this space there is a double gas-jet, for daylight in London is sometimes remarkable for its close resemblance to night. The gas-jets obviate this, and are shown in the cut by dotted lines. The window-frame has three grooves for the reception of three panes of differently-coloured glass, which can, according to requirement, be used either separately or collectively. They are lettered A, B, and C, and consist of yellow, orange, and red glass respectively. In the illustration they are shown raised to different levels for the sake of clearness only; in practice they are either down for use, or pulled up quite out of the way behind the doors D D, in a space provided for them. The cords which move them are fastened to the pegs at the left-hand side, marked *a*, *b*, and *c*.

“It will thus be seen that these dark rooms are most admirably adapted to the purpose for which they are built, and many an amateur who may not have the opportunity of

visiting them will be glad to take a hint from this description, which will enable him to provide some of the same conveniences for his own home use. Let him note in particular the admirable manner in which the apartments are ventilated. The square opening in the ceiling, marked V, is the main ventilator, whose duty it is to let out the vitiated air—and air must soon become vitiated in such narrow quarters. Of course, precautions must be taken that while the enemy, bad air, is let out, the other enemy,

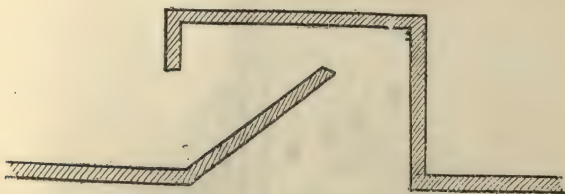


Fig. 19.—Section of Ventilator.

white light, must not find an entrance. Fig. 19, illustrating the ventilator in section, will readily show how this happy conjunction is brought about.

“But it is little use to provide an exit for bad air unless we also provide an entrance for pure air to take its place. In these dark rooms this necessary provision is not lost sight of. The fresh air finds an entrance through holes, guarded against the admission of light, which are pierced at the bottom of the doors, close to the floor. This arrangement is illustrated in Fig. 20.

“Everybody who has made any progress in the art of photography must have experienced the difficulty, when a batch of plates is in process of development, of those

plates quickly accumulating in the vessels used for final washing, until it becomes a problem to know how to dispose of them. When space is unlimited, they can be racked and put away in any safe place until they are dry; but it is an impossible matter to do so in the limited area of an ordinary dark room. Let us see how this little difficulty is

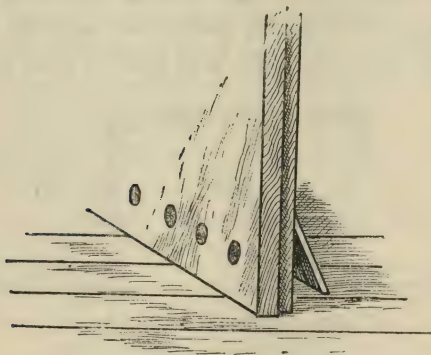


Fig. 20.—Ventilation Holes at Bottom of Door.

banished in the case before our notice. The glass pictures, as they are finished and receive their final rinse, are hauled up to the ceiling of the dark room by means of the apparatus shown in Fig 21, for which the London Stereoscopic Company would be fully justified in taking out a patent. Indeed, letters patent have been granted many a time and oft for contrivances of far less pretension and much less originality. The cut almost explains itself; but we will venture to supply a few details. Two pieces of grooving are fixed by means of rectangular ends, so that they lie at right angles to one another, as in an ordinary plate-rack. Below them hangs a zinc V-shaped trough to



catch the water dripping from the freshly-rinsed plates. This contrivance is slung up to the ceiling by a cord, and its movement is rendered easy by means of a hidden counterweight. The idea is perhaps borrowed from the grocer, who weighs his tea and sends his scales aloft in much the same fashion when he has done with them.

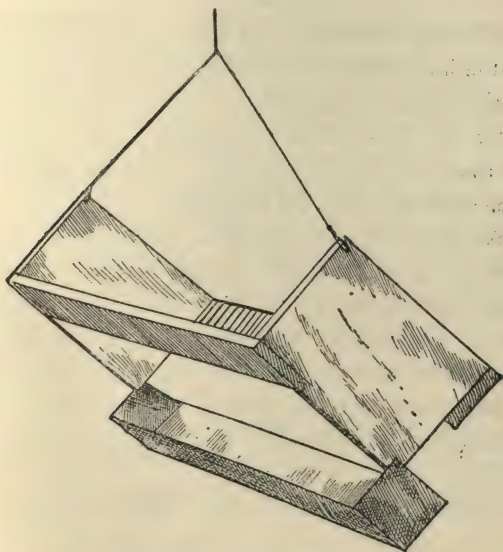


Fig. 21.—Hanging Plate-rack.

Amateurs and others will thank the Company for putting them up to this little dodge, as well as for pointing out how a serviceable dark room can be erected in the most limited space. We trust that many of our readers will avail themselves of the undoubted advantages which these well-contrived rooms offer to them, 'free, gratis, and for nothing.'"

## Making Magic Lantern Slides.

THE Magic Lantern—since it has been so improved by the introduction of mineral oil lamps—has become a favourite optical instrument. No means exist of showing off better the beauty of a photograph; but to render a picture available for the purpose, it must be printed as a positive,—not on paper, but on glass.

Thanks to the dry-plate system of photography, this can easily be done, and it is one of the very few operations connected with the art which can be carried on quite independently of daylight. A gas-jet or a paraffin lamp will answer all requirements. So that negatives taken during the summer can be made to yield glass positives in the dull winter time, when hardly any other photographic work is possible.

For printing lantern slides the following articles are required :—

Small negatives.

Printing-frame for same.

Gelatine plates  $3\frac{1}{4} \times 3\frac{1}{4}$  inches.

Usual developing dishes and chemicals.

A gas-jet or paraffin lamp.

All operations must be conducted in the dark room

under red light, the gas-jet being turned down as low as possible. Place the negative in the printing-frame as if an ordinary paper print were to be produced ; but, instead of the paper, place upon it, film side in contact with the negative film, a sensitive gelatine plate. This should measure  $3\frac{1}{4} \times 3\frac{1}{4}$  inches, but a quarter-plate will answer the purpose, for it can be afterwards cut with the diamond to the required size. Now hold the printing-frame so that it faces the lamp, at a distance of, say, two feet from it. Turn up the light for three seconds, and then turn it once more down again. Take the exposed plate from the frame, immerse in a dish of water for half a minute, and then develop it by the ferrous-oxalate method already described. It must afterwards be fixed and thoroughly washed, as in the case of a negative. A slight milky veil which often appears over the film is due to lime in the water. It is altogether avoided if rain-water be available, or can be removed by soaking the plate in a 10 per cent. solution of citrate of soda.

Those who are in the habit of using, and prefer to use, the alkaline method of development for the purpose of producing transparencies, can adopt the following formula :—

A {	Washing soda .....	1 ounce.
	Bromide of ammonium ...	10 grains.
	Water .....	1 quart.
B {	Sulphite of soda .....	2 drachms.
	Water .....	4 ounces.

Add sufficient citric acid to B to turn blue litmus-paper slightly red, after which add 32 grains of pyrogallie acid.

For use, add one drachm of B to seven of A, and give prolonged development, after which fix in Hypo, wash, and treat in every respect as a negative. Dry spontaneously in a rack. When thoroughly dry, the lantern picture should be covered with a black paper mask, with a square, round, or cushion-shaped opening, according to taste. Above this, a cover glass, the size of the picture, is placed, the whole being bound together at the edges with thin black paper. The best medium for attaching this paper to the glass is—

Gum arabic .....	1 ounce.
Loaf sugar .....	$\frac{1}{4}$ ounce.

Mixed with sufficient water to form a thick mucilage. This medium is readily mixed if the gum be purchased at a chemist's in a finely-powdered state.

Transparencies for window decoration on plates of any size may be produced in exactly the same way as that described for lantern-slides. Such a mode of decoration is invaluable in town houses, where a noble window too often has a forbidding outlook.

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## Enlarging.

THE amateur who has become an adept in producing good negatives, and brilliant prints from those negatives for mounting in his album, will soon begin to regret that his pictures are not larger. He will probably wish for something big enough to frame—"a thing of beauty and a joy for ever,"—to which he can point as evidence of his photographic skill. But it is only very few who can undertake the task of producing directly in the camera these large pictures. It means increased expense in every direction. The first cost of the apparatus is perhaps tenfold, after which the large plates required and the increased amount of chemicals consumed constitute a serious item of expenditure. One more objection to large pictures is the cost of transportation. The apparatus can no longer be carried by one pair of hands, nor will any kind of bicycle or tricycle sustain it.

But the owner of small apparatus need not for these reasons despair. A good negative, be it only of quarter-plate size, can be enlarged: such enlargement often giving a finer result than the original negative. Indeed, many will prefer the larger work, for the reason that the exquisite sharpness of the small negative is softened down in the process, the resulting picture being, therefore, more artistic.

The amateur has the choice of more than one method

of making an enlargement from a small negative. If he requires but one copy, the easiest plan is to employ a magic lantern, or an apparatus on the same principle which is sold for the purpose, treating his little negative like an ordinary slide, and throwing its image upon a board covered with white paper. This is done in the dark room. The image so projected by the lantern is carefully focussed, its size being governed by the distance of the focussing screen from the lantern. When this is satisfactorily accomplished the lens of the lantern is capped, and the board is covered with a sheet of gelatine bromide paper (sold for the purpose). Now once more the cap is removed, and the light is left to do its work on the sensitive surface. The time of exposure is dependent upon so many things that it is impossible to give any hard-and-fast rules. With a portrait lens, which is suitable for this class of work, and a mineral oil lantern of good construction, and supposing that the lens is two feet away from the sensitive surface, the exposure will be about one minute. A thin negative will make the time less, and a dense one, or a yellow one, will much increase it. The best plan is to make several test exposures, by taking a slip of the prepared paper and ruling it into half a dozen divisions. The image of the negative is then allowed to fall across the strip, whilst each division is successively uncovered. When the first division has had half a minute, uncover the next, wait another half-minute and uncover the third, and so on. This strip is afterwards developed, and it will be quickly seen which section of it has received the correct exposure.

After exposure the paper is placed in a dish and thoroughly wetted with water; drain this off, and apply a

liberal dose of the Ferrous-Oxalate developer already described. Do not let the action go too far, for the fixing bath (hyposulphite, already given) strengthens the image. After development wash well, fix, and again wash in several

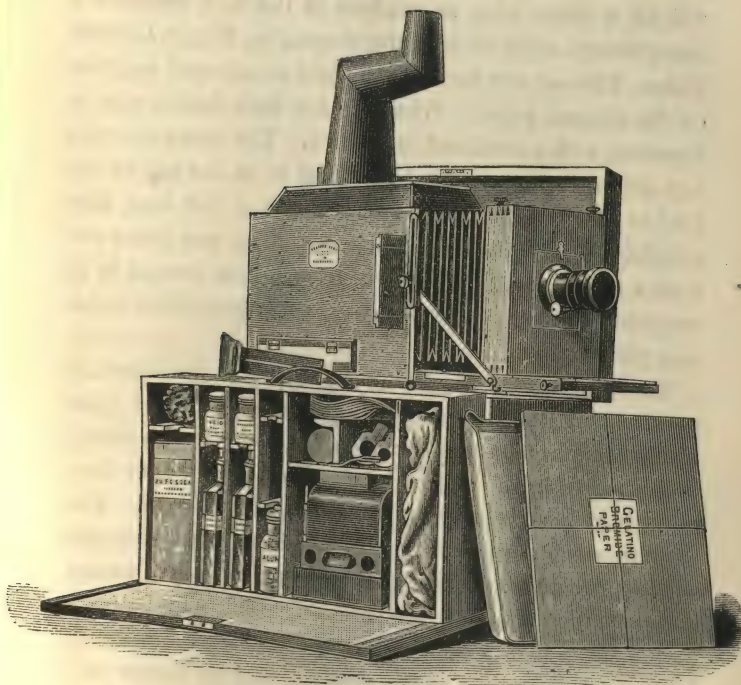


Fig. 22.—Enlarging Lantern, and its Outfit.

changes of water. A slight yellow discoloration can afterwards be removed by a bath composed as follows :—

Water	...	...	...	1 quart.
Sulphuric acid	...	...	...	2 drachms.

This is a necessarily brief epitome of the operations required, but full directions accompany the gelatine paper as sold.

If several copies are required of an enlarged picture, it will be a better plan to produce in the first instance a transparency, as detailed in the chapter on Magic Lantern Slides. This can now be made to yield an enlarged negative on the gelatine paper. When dry any little defects can be remedied with a brush and indian ink. The paper negative can be made transparent by placing it on the top of the kitchen oven, and ironing it over with a hot iron after sprinkling it with shreds of white wax. The wax melts and makes it translucent. This negative is now treated in all respects as a glass negative, and will yield good silver prints in a printing-frame of proper size.

Another method of producing enlarged negatives or positives, either upon paper or upon large sensitive glass plates, is rather more troublesome ; but it has the advantage of not requiring any apparatus that the photographer does not already possess. In this case, daylight is utilised. The room in which the operations are carried on must have the window completely covered in with brown paper, except one opening the size of the negative, which can be supported there in a printing-frame with the back removed. Place a table close up to the window, and by means of a box or shelf support the camera (ground-glass thrown out of the way), so that the lens is central with the centre of the negative, but points away from it towards the room. At a suitable distance from the lens place a white screen, and the image of the negative will appear upon it. Unless the window is high up and has an uninterrupted view of the



sky, a piece of cardboard must be placed outside it at an angle of 45 degrees, so as to reflect the sky light through the negative. If a positive picture be placed in the frame the enlarged image will of course be negative, and if this latter be allowed to fall on a large gelatine plate, it can be developed by any method to which the operator is accustomed. We trust that these few hints may lead the amateur to experiment for himself, and he will then quickly find what a new power he possesses, even though his camera and lens be small. The rapid rectilinear form of lens is well suited to the purposes of enlarging.

The use of special Enlarging apparatus like that figured in the annexed cut, renders the necessary operations very easy of performance. The apparatus may be roughly described as a much-extended camera and a magic lantern combined; and it has this special advantage, that it can be used, when desired, as an ordinary magic lantern for the exhibition of pictures. It is sold by the Company with every requisite ready for work, and it certainly represents the most complete and compact enlarging apparatus which has ever been made. Specimens of its work can always be seen at the Company's establishments at Cheapside and Regent Street, and every one who has used it is loud in its praise.

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## Photo-Micrography.

ONE of the most interesting branches of photography is that involved in the partnership of the camera with the microscope, and beyond the mere interest of this wedding of two optical instruments, there is the undoubted advantage of undertaking work which can be performed in the evening, or winter months, when photography in general is impossible. The term "Photo-Micrography" is applied to photographs of microscopic objects which are enlarged in the photographic camera. Micro-photography, on the other hand, is the term applied to photographs of very small dimensions taken in the microscope. In this chapter we intend dealing with photo-micrography only.

At first sight, the taking of a photo-micrograph is a very simple matter indeed, and if we merely want a photographic reproduction of a microscopic object, and are not very particular as to its definition or other good qualities, such a thing is very easily obtained. The instruments required are a camera and a microscope. Unscrew the lens from the camera, and place in the opening the tube of the microscope which has been brought to a horizontal position, having previously robbed the latter instrument of its eye-piece. Screw on to the microscope a one-inch objective, and place upon the stage any common object

such as the proboscis of a blow-fly or the leg of a beetle. Cover the two instruments with a focussing-cloth, and, turning the microscope towards the window, or towards the flame of a paraffin lamp, focus the image of the object on the ground-glass screen of the camera, and it will be noticed that by the usual methods of focussing a very clear image can be obtained. Indeed, it would be a capital plan for those whose eyes get strained with continual microscopic work, to adopt this method for the mere purpose of viewing ordinary microscopic preparations, setting photography quite out of the question. Such is a very brief *resumé* of the operations which are necessary.

If, however, we want to obtain really good results,—and good results are worth trying for when all is said and done,—we must take far more pains with our work than in the operations just described. To begin with, we must possess a microscope that is really a good one. It need not be crowded with a lot of brass screws and bright parts that are more ornamental than of real use, but the workmanship must be good, although it may be as plain as possible. The ordinary student's microscope made on a good model will do all that is needed.

If the operator has not already purchased a microscope, it will be of great advantage if he can have one made or altered to meet the requirements necessary for photo-micrography; and these alterations are so very slight that the extra expense entailed is almost *nil*. To begin with, the microscope must have a firm stand, and if the stand be of the claw form, the feet may, with advantage, be perforated, so that the instrument can be screwed down to a table or base-board. The advantage of this provision

will presently become apparent. Then it is a *sine quâ non* that the microscope should be readily bent down to the horizontal position. The mirror should be detachable, or capable of being so bent down as to be out of the way; for in the operations that we shall describe it is not wanted. With regard to the tube of the microscope, it should be short, like most Continental models are made; indeed, we have found distinct advantage in having it made not more than three inches in length; that is to say, three inches from the socket into which the objective screws to the opening for the eye-piece. Another tube of about the same length can fit into this short tube so as to bring the instrument up to the normal length for ordinary microscopic observations. The fine adjustment of the instrument is the weak point in most microscopes, English and foreign, but we must make the best of it such as it is. The form we recommend is that represented by a little wheel placed in front of the instrument in its vertical position, but of course underneath it, as it is placed horizontally. This wheel should move very freely, and have a fine screw attached, and for our present purpose it should be cut with a groove in its milled head sufficiently large to hold a stout silk cord. Let us now turn to the annexed diagram, where the position of the various parts of a complete apparatus for taking photo-micrographs will be readily understood.

The mode of illumination recommended and adopted in the diagram is a paraffin lamp (*l*), which is so fixed upon a heavy stand (*f*) that it can be raised or lowered, so that the flame may be *optically centred* with the rest of the apparatus. This stand (*f*) also serves as the support for a



concave reflector, which is also capable of being raised and lowered with the lamp. Next to the lamp comes the condenser. This may be of the ordinary form sold with microscopes, and consisting of a heavy brass disc, into which is screwed a pillar holding the condensing-glass on a universal joint: this is lettered in our figure (*h*), and immediately behind it and hanging to its frame is a small pierced piece of metal plate which acts as a diaphragm. Four or five of these diaphragms, of different apertures, should be provided to suit different objects. Again referring to the cut, *n* is the coarse adjustment of the microscope, *p* is the mirror thrown out of gear, as already described, and *s* is the stage which should be provided with two strong spring-clips, so that the object can be gripped firmly upon it.

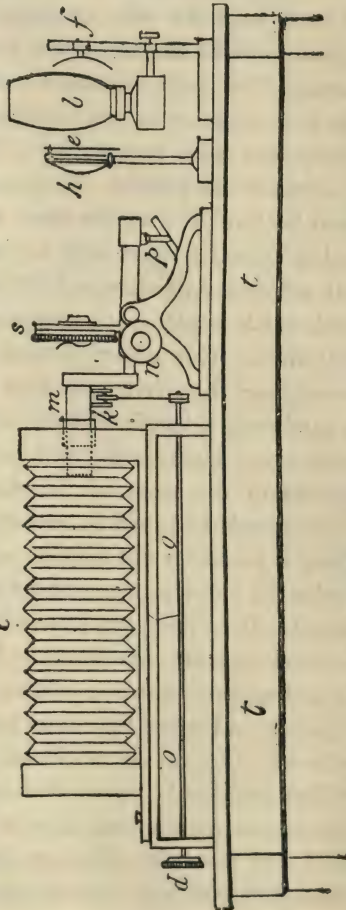


Fig. 23.—Complete Apparatus for taking Photo-micrographs.

It is also of great assistance to the operator if the stage be a revolving one; *m* is a short body microscope inserted in the camera *c*. And here another little useful addition to the apparatus may be noted. This is an extra tube to screw into the flange which is already affixed to the camera to hold the photographic lens. This tube should be lined with black velvet, so that in focussing the microscope tube can fit into it easily, and move backwards and forwards as the focussing screws are manipulated. The tube of the microscope should also be furnished at the time that these operations are being carried forward with a sleeve of velvet, to destroy all reflections which would interfere with the definition, and which would cause unsightly marks on the resulting negatives. This sleeve, it need hardly be pointed out, must have the velvet surface on the inside. The camera *c* is of such a length that the image obtained can be of large size. Here we may call attention to the use of the groove in the screw of the fine adjustment, as already recommended. It will be seen that underneath the camera there is a wooden rod marked *oo*, which terminates exactly under the fine adjustment of the microscope *k* in a grooved wheel. Over these two grooved wheels (*i.e.*, the wheel on the rod and the wheel attached to the fine adjustment) is tied a piece of strong silk, so that the two are geared together, and when one turns round the other must turn with it. The rod *oo* terminates at the other end with a milled screwhead (*d*), so that as the operator looks on the ground glass of his camera, he can turn this milled head and focus the object to the greatest nicety without moving his position. The whole arrangement is supported

on the flat table (*tt*), and should the optical centre of the microscope not quite correspond with the centre of the camera, it can be raised on a piece of board, as shown, by which the correct height can be attained.

It has been held by many that the best light for this kind of work is actual sunlight, and this is, of course, true of most photographic operations; for nothing can equal in intensity the light that we get from the great orb of day. But sunlight (particularly in this country, and more especially in large towns and cities such as London) is a very scarce commodity,—and scarce indeed when the winter months are upon us, during which time the photographer is most likely to take up this kind of work; and it must be remembered, too, that the actinic power of the sun varies much with the time of year, the time of day, and is affected by various local conditions, so that, if we depend upon sunlight, uncertainty increases at every step. And there is another difficulty in using sunlight, of which the merest tyro will readily see the importance, and it is this. The movement of the earth causes a spot of sunlight, such as we must depend upon for our work, to continually shift its position. If, therefore, we are resolved upon employing sunlight, and supposing that sunlight is at our disposal, we must obtain a mirror working by means of a clock, so that the sunspot shall be apparently still and ready for our purpose. Such an instrument is called a Heliostat, and can be procured at the optician's. We cannot, however, advise the amateur to adopt this method of illumination, more particularly as the paraffin lamp will answer all his requirements, and will represent a fixed quantity of light not subject to variation.

With regard to mounting and preparing objects for photography we need not say much, for full particulars for doing this work will be found in any of the large treatises on the microscope, such as those of Beale and Carpenter. There is also an excellent little manual by Davies which is devoted to this particular phase of microscopic work.

The great thing to avoid in mounting is the use of a medium that is at all yellow in colour, for it is obvious that a yellow colour causes a great diminution of the actinic power of the light, and, consequently, the necessary exposure is increased to an almost prohibitive extent. If the microscopic objects be already purchased, or in existence, we must, of course, take them as they are, but it is as well to avoid those which are yellow for the reason already given. But it is only right to add that the difficulty can be surmounted by the use of what are known as Orthochromatic Gelatine plates, which are now coming into the market, and which are rendered by chemical means sensitive to both the yellow and red rays of the solar spectrum.

Taking up such a book as the Rev. Mr. Wood's "Common Objects for the Microscope," we shall find that there are a great many ordinary things,—minute Algæ, Infusoria, and the like,—which, for the transient purposes of photography, need not be mounted, in the usual signification of the term. A great many of these are best placed at once in glycerine and camphor water. This mixture preserves their original form, and obviates any chance of their being spoiled by mildew, &c. ; but for further particulars concerning this part of our subject we must refer our readers to the books already mentioned.

Some microscopic objectives are quite unfit for photo-



graphic work, and in purchasing the purpose for which the glass is required should be plainly stated. An inch objective is, perhaps, the best for a beginner to commence work with ; and, when he has felt his way with this low power, he may proceed to adopt powers giving greater magnification. But for the large class of what we may call popular objects, such as different parts of insects, the inch is the best to use, simply because its magnifying power is so small compared to that given by higher objectives that the whole instead of a part only of the object is included in the field of view. The objective should be furnished with the standard screw, adopted now by the various societies and the different makers of microscopic objectives. Its definition should be clear, and it should be free from colour. An inferior objective may often be detected by the yellow colour which it exhibits, and such an objective, especially for photographic work, should be studiously avoided. If the photographer has not been used to microscopic work he will do well to place himself in the hands of one who is more fortunate ; for there is, perhaps, nothing that can be bought in which the purchaser is so likely to be misled as in the purchase of a microscope. Many are simply made to sell. They look very pretty, and are well finished on the outside, while the glasses are almost worthless, unless we are content to regard the instrument as a mere toy.

There is one difficulty in this work which frightens a great many from taking it up, and that is what is called the difference between the visual and chemical foci of a lens. It would take us too far from our subject to fully explain the reason of this difference, but the effect with some lenses is as follows :—The image given by the microscopic objec-

tive may be focussed most carefully, and on the ground-glass screen will appear perfect ; but when a negative is taken of that object and developed the image will appear blurred. Many microscope-makers now add another lens to their objectives by which this want of agreement between the visual and chemical foci is adjusted, and the beginner will do well to purchase an objective so corrected. If, however, he should already be provided with his objective, and one which is uncorrected, he must have some means of adjusting the matter for himself. Let him proceed thus :—

Focus the image as sharply as possible, then throw it slightly out of focus, and move the fine adjustment-screw until the image appears to be surrounded by a red areola. Although it now appears to be indistinct, the chemical focus will be right and the resulting photograph will be sharp. But this difficulty need not frighten the beginner, for it is one that seldom occurs except when using very low powers ; and, as already pointed out, if the objective has been corrected, the worker need not in any way trouble himself about the matter.

With regard to exposure, very little can be said, simply because this exposure is governed by a variety of circumstances. The amateur photographer knows that this is the case in ordinary photographic operations, and if he will bring the knowledge he has acquired to bear upon these less familiar operations with the microscope, and will mix his observations with a little common sense, he will, after a few trials, soon be able to master this part of the subject. Some objects will require only a couple of minutes' exposure, others may want ten minutes or more,

but this must be always a matter of judgment and experience.

With regard to the use to which negatives obtained by the help of the microscope may be put, our advice is to print them on glass and to use them as lantern-slides. A vast amount of ingenuity has been spent by different workers in contriving lantern-microscopes which shall show before a large audience a disc of many feet in diameter, bearing the image of an ordinary microscopic object. Such instruments can only have limited success with the present modes of illumination at disposal. The rays of the most powerful form of lime-light, if made to pass through an object which is perhaps only one-sixteenth of an inch in diameter, are so attenuated when they reach the screen that the image, although full of definition, is very poorly illuminated. The advent of some form of electric light for the lantern, if such a thing can be invented, will at once put a changed face on the matter, but at the present moment the best lantern-microscope made is only fit for a very small lecture-room.

Now, let us point out the advantage of using these photo-micrographs as lantern-slides. They can be taken direct of the normal size  $3\frac{1}{4}$  in., and developed with iron so as to present a black and white image. Through this image the lime-light, or even an oil-light, will send its rays with little obstruction; at any rate, with no more obstruction than they meet with in going through an ordinary lantern-slide. The photograph, if properly focussed and made with good apparatus, will be full of the most exquisite detail, and when it is enlarged, as it easily can be with the lime-light, to a disc of 15 ft. or more in diameter, or by

an oil lantern to a diameter of 4 ft. or 5 ft., its beauties, instead of being reduced, are made more evident. Those who take up photo-micrography have, therefore, the means at their disposal of showing their microscopic preparations to the greatest possible advantage; and, moreover, its practice represents a very pleasing way of spending a few hours of leisure when other photographic work is next to impossible.

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## Instantaneous Photography.

ONE of the most fascinating phases of modern photography is comprised in what are known as instantaneous pictures. The word "Instantaneous" is rather a misnomer, for there is really no such thing as an instantaneous photograph. Such pictures are taken usually in a small fraction of a second, but still, that fraction does represent a certain duration of time. Seldom are pictures seen which have been taken with a less exposure than the one-fiftieth part of a second, although certain photographs have been taken by means of special and complicated apparatus, in even less time than that.

Mr. Muybridge, of California, was, perhaps, the first to excite surprise with these photographs, and to demonstrate that modern gelatine plates are capable of receiving and recording an impression so brief in character that the human eye is quite incapable of appreciating it, except when presented to it through the medium of photography.



It may be interesting to call to mind the apparatus by which the wonderful results achieved by Mr. Muybridge have been produced. The subjects to which he has devoted his attention are the attitudes of different animals while in motion; thus, his photograph of a trotting horse has now become historical. His studio (if studio it may be called) is in the open air, and consists of a miniature race-course. Along this course the animals to be photographed are made to trot, canter, or gallop, as the case may be, while a battery of cameras opens fire upon them, and takes their photographs in the particular attitudes that they happen to assume during their passage before the lenses. This battery consists of eighteen separate cameras, each lens of which is furnished with what is technically known as an instantaneous shutter. (These shutters we shall presently describe in detail.) Each shutter has a thread attached to it, which is in communication with an electric arrangement capable of moving it in the least possible fraction of time. These various threads are carried across the race-course breast high, and are fastened to a fixed support at points opposite the cameras. Any animal trotting along this course, a horse for instance, will break, by the passage of its body, each thread in succession: with the result that each time a thread is broken, the animal is photographed in a period of time wonderfully short, and which can only be compared in swiftness to a lightning flash.

The resulting photographs, as will have been noticed by those who have seen them, are most unnatural in appearance, and it is difficult to conceive that a photograph which is generally associated with absolute truth, should be

capable of affording images which seemed so contrary to nature. The explanation of this apparent contradiction is not difficult to understand. The human eye, although it must ever be considered as the most perfect optical machine there can be, and far above the powers of any optical arrangement made by human hands, has certain limits. One of these is associated with a peculiar property possessed by the eye, which although most valuable and necessary to our comfort as human beings, makes it in this particular feature inferior to a photographic lens.

The eye may be compared to a photographic camera ; it has a lens in front called the crystalline lens, and at the back it has a retina, which may be aptly compared to the focussing screen of the camera, upon which the object seen is focussed. Upon this retina there exists a net-work of nerves, which convey the impression of sight to the brain. By a wonderful provision of nature the image of any object seen remains impressed upon the retina for at least the eighth part of a second. This fact may be rendered obvious to those who have not studied the matter, by the circumstance that when we wink, as we continually do in order to lubricate the eye-ball, we are quite insensible of that action. If the retina did not possess this power of retaining the image, as just described, we should have the uncomfortable sense of being placed in absolute darkness every time the eye closed in winking. But the image last seen, being retained for at least the eighth part of one second, at once removes this formidable difficulty from us. It will, therefore, stand to reason that the power which the eye has of this retention of the image quite precludes us from appreciating any quick movement which takes place in less time than the

eighth part of a second. But the photographic lens has no power of retention ; it simply impresses the image before it as quickly as the mechanical arrangements fitted to the instrument will allow. The wonderful fact, therefore, becomes evident that the lens will photograph an object which the human eye has no power of discriminating.

Although there must be many who have not had the advantage of seeing the results achieved by Mr. Muybridge, there are plenty of photographs exhibited in this country which will show the extraordinary power of modern apparatus in this particular field of work. An express train, travelling at the rate of sixty miles an hour, has often been photographed. One of these pictures at present before us was photographed with an instantaneous shutter, which worked at the marvellous speed of the 120th part of a second. Now, if one cared to make the calculation, it would be found that a train travelling at that speed would move in the time indicated about six inches forward, but as the photograph is taken "end on," so to speak, this small movement is not noticeable. But even a quicker thing than an express train has often been photographed with success. A flash of lightning, which occurs at a speed so great that we cannot possibly estimate its exact duration, has often been impressed upon the photographic plate. It is only right to mention, however, that in this latter case we are not dependent upon a mechanical movement of any kind. To procure lightning-photographs it is merely necessary to present the camera at night through an open window during a thunder-storm, with the lens uncovered, so that the first lightning-flash that comes within the field of view may be duly impressed upon the

plate. This work is necessarily attended by a great many failures, as lightning-flashes which occur out of the field of view will spoil the plate placed in the camera, and another one must take its place, until we are fortunate enough to obtain a flash in the right portion of the sky. There are many kinds of instantaneous shutters made; the most simple is called the drop-shutter. It consists of a frame of wood, with an orifice in it, which fits upon the hood of the lens. In this frame is a groove, in which there drops a light piece of wood or vulcanite, with a corresponding aperture pierced in it; this shutter is released by a trigger, so that in falling the aperture in the moving part rapidly passes the lens aperture, and during that brief fraction of time the photograph is taken. The speed of such a shutter can be, and is usually, increased by the attachment of an india-rubber band. Such is the instantaneous shutter in its crudest and most unscientific form. Other shutters have been made which will do the requisite work far better, and which possess certain attachments which make the working of them far more easy to the operator.

The beginner is apt to imagine that instantaneous work must necessarily mean special and costly apparatus, but this is not the case. With an ordinary gelatine plate, such as those supplied by the Stereoscopic Company, an instantaneous photograph can be quite as easily taken as a photograph of any still object. The one great requisite in this class of work is brilliant light; for the exposure is so greatly shortened, that all the light possible to be had must be enrolled in our service. For this reason we do not recommend amateur photographers to attempt to obtain instantaneous pictures except in the spring or



summer time, and only during those hours of the day when the sun is at its brightest. These remarks do not, of course, apply to foreign countries where the sunlight is a commodity that need not be looked upon as a very scarce gift of fickle fortune.

One of the best shutters is that known as the "Phantom." It is strongly made of vulcanite, and does not readily get out of order (*see annexed illustrations*). It consists of a grooved



Fig. 24. — "The Phantom" Pneumatic Shutter.

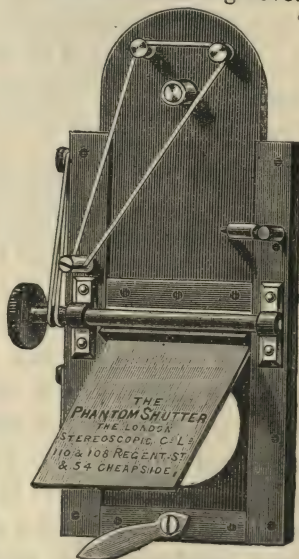


Fig. 25. — "The Phantom" Shutter.

frame which fits closely on to the lens by means of a brass flange at the back, and which comprises both a drop shutter and a separate flap. In action the front flap is first caused to rise so as to uncover the lens to its full aperture, and then the shutter proper instantaneously drops so as to close the aperture. Attached to the shutter is an india-rubber tube, terminated by a pneumatic ball. This ball is held in the hand of the operator, who, when he is ready to expose his plate, simply watches the moving object before him, gives the ball a gentle squeeze, and a puff of air that is projected through the tube puts the apparatus in motion, and the exposure is made. This pneumatic arrangement is applied to shutters of other patterns. Another shutter, which takes up less room, and can, indeed, be carried in the waistcoat-pocket if so desired, is known as the "Economic." This has been most favourably noticed by the Press, and the following account of it we extract from the pages of the *Camera*:—

"The shutter to which we call attention is named the 'Economic,'—we presume on account of its low price. It might, too, be named so for its small size, for it exhibits such economy of space that a quarter-plate one can easily be put into the waistcoat-pocket. This shutter is made of ebonite, with the flap of metal. By the action of the thumb-screw, shown on the left-hand side (*see cut*), the flap is raised to the horizontal position, and by continuing to turn the screw, it once more descends and closes the lens. But this action has put tension on a small watch-spring—not shown in the picture,—so that the next exposure can be brought about instantaneously by simply touching a button provided for the purpose.

"It will be noted that the 'Economic' shutter has no means of regulating the length of time during which the plate is exposed. We do not consider this omission to be a fault. If a shutter works quickly enough for figures in motion, it will do what is required. In using it during very bright weather and for seascapes,—when it might reasonably be thought that a plate might receive too much exposure,—the risk can easily be obviated by inserting a smaller stop in the lens."

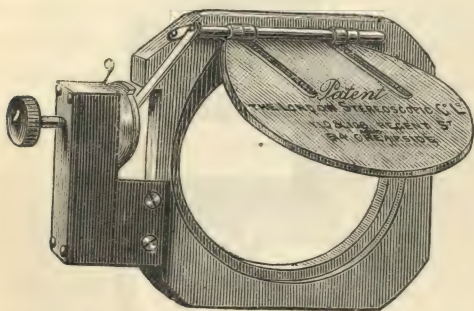


Fig. 26.—The "Economic" Shutter.

The next shutter which we have to notice is that called the "Right-about-Turn." It is shown in the illustration, page 92, and again we will extract a description of it from the same source as that from which we have just quoted:—

"A shutter of novel design has lately come into the market, and is worthy of some detailed description. It is called the 'Right-about-Turn' shutter; this curious name being due not only to the peculiarity of its movements, but also, no doubt, to the fact that its inventor is a gallant officer in her Majesty's Service.

The shutter, which is shown in the annexed cut, consists of a vulcanite frame. Attached to this frame is a metal backing, provided with collar to fit the hood of the lens. The metal plate is prolonged at the left-hand side (*see cut*), and forms there a triangular box, about which more presently. The shutter proper is made of wood, and has at

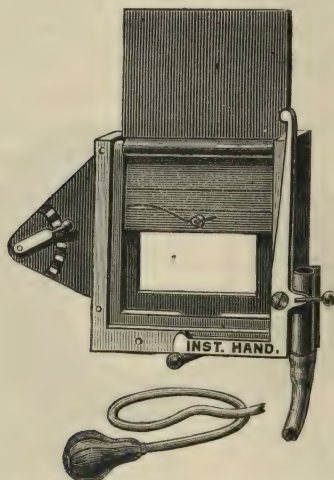


Fig. 27.—The “Right-about-Turn” Shutter.

one end a double hinge, made with leather, exactly after the style of the shutter of a dark slide. In the picture this double hinge is indicated by the two black lines which cross the shutter at its lower end. Below the hinge is seen a steel wire spring, which passes through a small staple affixed to the shutter. The other end of this spring is coiled in the triangular box already referred



to, and its tension can be regulated so as to vary the speed of the shutter by the little index hand seen outside the box. To set the apparatus, the shutter is raised until the hinged part is against the round bar shown at the top of the frame. The shutter is then doubled over forwards, and is held to its place by the L-shaped catch on the right-hand side. When this catch is released by hand, or by pneumatic ball, the shutter instantly opens, for the flap is pulled over by the force of the spring, and what was just now its upper part descends to close the opening of the frame. This little apparatus is wonderfully ingenious and complete."

One more shutter must now be submitted to consideration,—namely, Marshall's patent,—the chief advantages of which may be thus summarised:—

1. The shutter works with exceptional freedom, and is absolutely light-tight.
2. Sticking is impossible.
3. Any rapidity can be obtained.
4. With the strongest elastic bands the pneumatic release will instantly effect its purpose.
5. The destructive shock and jar to the camera, so common in high speed shutters, is here avoided.
6. There is no recoil.
7. The shutter can be worked in any direction—upright, sideways, horizontal, upside-down, pointing to the skies, or from a balloon pointing earthwards.
8. The shutter is equally light-tight in whatever position it may be worked.
9. The parts are simple, and are fitted together with screws only, so that any part is easily replaced.

Back and front views of this useful little piece of apparatus are appended below.

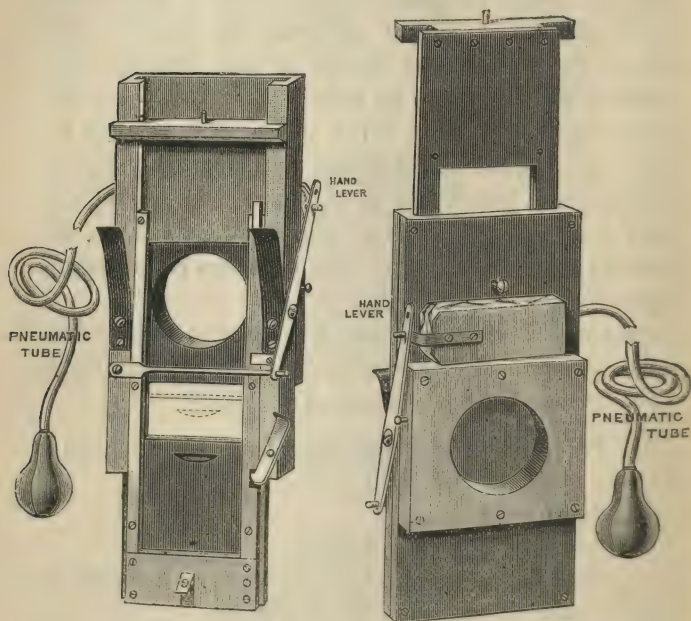


Fig. 28.—The “Marshall” Drop Shutter.

The Stereoscopic Company have such extensive means of procuring all the best apparatus in the market, that they have constantly submitted to them shutters of various patterns, and therefore the purchaser has the choice of a great number, and he is advised to see these for himself, and have their various points explained to him, before he ventures to decide on any particular kind.

## Detective Cameras.

A SOMEWHAT new phase of photography is exemplified in what are known as "Detective" cameras. The detective camera, in its crude form, was invented some years back, with the hope that, as its name implies, it might be of some use to the metropolitan police for taking the portraits of those whose features it may be desirable to retain, but who might possibly prove unwilling subjects to the ordinary photographer. This apparatus gives one the means of using the camera so disguised that it may be employed for taking a picture without the persons photographed being aware that they had unwittingly lent their aid to the transaction. Some detective cameras which are on sale are not very well disguised, and those who possess them cannot use them with that security and freedom from observation which they might desire. But this charge cannot certainly be brought against the "Book Camera" which has been lately brought out by the Company. This really marvellous piece of apparatus has the appearance of an octavo book of a thickness corresponding to about 200 pages. It can be carried under the arm, furnished with a book-marker to still more completely hide its real character, and so carried that no one would suspect that its owner was bent upon any process more aggressive than the study of literature. But

in reality, this pseudo book is a camera of the most perfect kind. Upon opening it, it is found that its top and bottom, which look like the edges of the leaves, expand like a duck's foot, so as to form a light-tight covering to a wedged-shape camera. When opened, a dark slide (two or three of which can be carried in the pocket without any inconvenience,

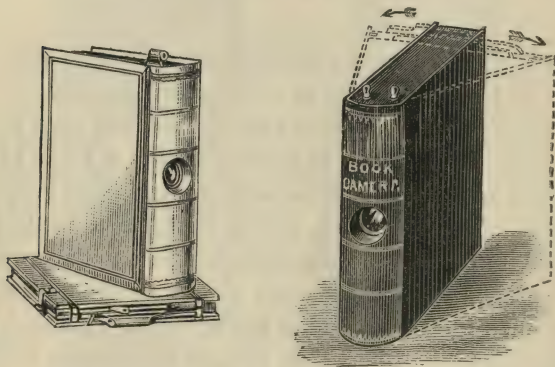


Fig. 29.—“The New Detective Book Camera.”

and each of which holds a couple of quarter plates) can be readily inserted in a groove provided for it. The lens is so made that it is always in focus for objects not nearer than three or four yards from it. The pressure of a concealed spring in the back of the book causes an instantaneous shutter, also concealed, rapidly to uncover and again cover the lens, and the photograph is secured. We need hardly point out what a valuable adjunct such an apparatus must be to those who are travelling abroad. Setting apart the inconvenience that must be met with, to a



certain extent, in carrying ordinary photographic apparatus about in foreign climes, the little difficulties with the custom-house officials (which, by the way, are now fast disappearing), &c., there is always the question of weight and impedimenta to be considered. The Book Camera at once obviates these difficulties. It is lighter than an ordinary book of the same size, and the plates are so small that two or three dozen can easily be stored amongst one's luggage without observation. Armed with such a camera, the traveller, from the moment he steps on ship-board to the moment that he returns home, can find all sorts of scenes, of which he will have no difficulty in obtaining trustworthy records. From passing ships he can obtain instantaneous pictures full of beauty, and giving the wave-motion and all kinds of other effects which can only be seized thus instantaneously. Then, when he arrives at his journey's end, he will find in passing through the streets of any foreign town unfamiliar scenes, which he will be only too glad to record as he walks along,—an unsuspected tourist. In France, especially, this camera would be of great service, as stringent laws have been recently made against foreigners sketching in that country ; and these laws, we believe, also cover photographic operations. The owner of the Book Camera can defy everybody, for no one will know what he is about.

Great care must be exercised in the development of instantaneous pictures, and the following remarks by an adept at this work cannot fail to be useful to our readers. There is a very unfortunate and careless way of using the terms rapid, instantaneous, strong developer, weak de-

veloper, and the like, which must always lead to confusion. One man will call an "exposure" rapid when he uses the smallest stop and exposes by taking the cap off and replacing it quickly by the hand. Another will use a medium stop and the same method of exposure. Still another will use a large stop and a drop shutter, or even a rapid shutter at full speed. Now, it is obvious that the character of the development is entirely different in each of these cases always assuming the light to be the same in every instance. But here again is another difficulty,—the light is often not the same. One man talks about making exposures with bright sunlight on objects upon the water, or views where water forms a large proportion of the picture, while another refers only to groups or landscapes where water is absent. In these latter cases an entirely different treatment of the development is necessary to secure good negatives.

As is well known, the amount of light that reaches the plate will determine the quantity of actinic work done upon the sensitive surface, and this in turn will determine the amount of work to be done by development. Therefore, the actinic power of the light being the same in both cases, more work is done upon the plate with a large stop than a small one, the time of exposure being the same; and, when a large quantity of actinic energy has thus acted, the developer will have less work to do as its share of the production of the negative. If a small stop is used, the time of exposure being the same, the actinic work done will be small, and the work done by the developer will have to be great. In discussing the question of the development of

rapid exposures, it is, therefore, absolutely necessary to come to some understanding as to the meaning of the term "instantaneous" as applied to them. Leaving out of the question the actinic power of the light at different seasons of the year and hours of the day, we must confine our attention to the problem in hand—the proper developer to apply to a plate that has received much or little light-action in a given time. For, the speed of the exposure being the same, the amount of light received by the plate determines the force to be applied in the development. The question of the actinic power of daylight is one of individual judgment, and no amount of writing or discussion can impart this. But the circumstances under which the light is acting are pretty well defined, and can be in a measure formulated. In landscapes, in summer, the greater number of rays that reach the sensitive plate are of the less actinic character,—grays, browns, greens; while in winter landscapes, with snow, we have more of the actinic rays. In marine views, on the other hand, the reflections from the water bathe the objects in a perfect flood of light, consisting of rays of all characters; and, furthermore, the objects upon the surface of the water generally reflect more white and less of coloured light than those upon land. From a consideration of these facts it is evident that, given the same exposure, more actinic work will be done upon a plate exposed upon subjects on the water than upon those on land. It is, therefore, necessary to acquire some idea of the amount of work done by the light upon the plate, if we are to apply the developer rationally and secure good negatives.

Having given some idea of the considerations to be remembered while making the exposure, we will now take up the question of development. And at the very beginning let us say that we do not want to talk about under-exposed plates. The plate that has not received enough light-action to give a picture in twenty minutes under development, is not worth the time spent upon it. We do not here mean that a thin picture is not worth working at, but a picture that lacks detail. You may have a thin picture with plenty of detail, and this will give a good negative under proper treatment; but a plate that has received too little actinic action will never give a good negative. Some one will naturally ask, "Well, what is the correct amount of exposure?" Our answer is that it depends entirely upon the brand of plates you use. Some plates are so sensitive that a medium stop and a rapid shutter will give sufficient exposure at four o'clock in the afternoon of summer, with fairly good (not bright) light, that a good negative can be developed in five minutes. This is true of the most rapid plates now made. With less rapid plates, and the same exposure, the lens would have to be nearly wide open; while with many plates, and the latter exposure, no picture would appear in thirty or forty minutes. Such plates we should call under-exposed, and their destiny would be the waste-box.

Nothing but a few experiments with a given brand of plates will teach one how to use them. It is folly to set down any hard-and-fast rule for all kinds of plates. During the time of the experiments on exposure, great care should be taken to form a judgment of the quality of the light and its mode of falling on the subject.



Having determined the right exposure for the given brand of plates in use, the development is moderately simple. With the most careful judgment as to light, there is one thing that will often happen,—that is, over-exposure. With this possible contingency in mind, we proceed to develop a plate in the following manner :—

Into one dish pour the mixture of the developer in the proportions given upon the formula that accompanies the brand of plate in use. These formulas are generally about right, that is, those made with either soda or potash carbonates as the alkali. The soda-developer is less likely to frill the plates than that made with potash. But the latter will often bring out details not obtained with the former. In making up a potash-developer from a soda formula, it requires one-third more potassium carbonate to make it equivalent to the amount of sodium carbonate given. In addition to the regular formula, which should contain only a little bromide of potassium (say 1 grain in 4 ounces), make up another bath in the same manner as the first, but with more bromide (2 grains to the ounce), and place the dish alongside of the first one made up. The plate is first placed in the normal developer and its progress watched. If the development begins in about one minute, and only the high lights come out, continue the development until all the detail in the shadows appear. Then wash the plate pretty thoroughly in running water, and place in a bath of alum and citric acid to remove stains. In this development take care that the high lights do not begin to fog, for if they do the negative will lack brilliancy. If the detail will not come out without fogging the high lights, the development may be continued a little longer, but the result

will be a poor negative, for the plate that shows this characteristic is under-exposed, and we think but poorly repays any time spent upon it in development. It may be improved by intensification, but not by further development.

If, on the other hand, in placing the plate in the normal developer the image appears quickly and contains considerable detail within one minute after putting it in the bath, remove it at once and place it in the developer containing much bromide. The image obtained quickly in the normal developer will be thin, and by placing it in the bromide-developer, and allowing it to remain there, it will gradually become more dense, and in ten or fifteen minutes a good negative will be obtained.

We append the formula for Beach's potash-developer, which the worker can make up for himself, or can purchase ready made from the Company. Mr. Beach is the President of the Society of Amateur Photographers of New York, and the following particulars of his developer have been published by him.

The proportions which Mr. Beach has found by experience to work well are as follow :—

#### NO. 1.—PYRO SOLUTION.

Warm distilled melted ice or rain water	...	4	oz.
Sulphite of soda (crystals, chem. pure), (437 grs.			
to oz.)	... ..	4	oz.

When cool add—

Sulphurous acid...	... ..	3½	oz.
Pyrogallol (1 commercial ounce)	... ..	437	grs.

When completed, the solution should measure  $9\frac{1}{4}$  fluid ounces.

### NO. 2.—POTASH SOLUTION.

Make two solutions as follows:—

A—Warm water...	...	...	...	...	4 oz.
Sulphite of soda (crystals, chem. pure),					
(437 grs. to oz.)...	...	...	...	...	2 oz.
B—Water	...	...	...	...	4 $\frac{1}{2}$ oz.
Carbonate of potash (chem. pure), (437 grs.					
to oz.)	...	...	...	...	3 oz.

A and B are next mixed together, and it will be found that the completed solution will measure about 10 fluid ounces.

The solution of sulphurous acid gas, which can be purchased at any chemist's, will be about seven per cent. strong; that is, the water will absorb about seven per cent. of its volume of the gas injected into it; but by evaporation, through the escape when the bottle is opened, the strength is sometimes reduced a little, which does not seriously affect the properties of the water for our purpose. Water saturated with the gas should possess a specific gravity of 1.034.

In preparing the pyro solution, Mr. Beach first dissolves the sulphite of soda in warm water and lets it cool, then adds the sulphurous acid, and finally adds the bottle of dry pyro by pouring the sulphite solution from the measure into the pyro bottle and back again until it is all absorbed.

In his previous formula Mr. Beach gave the proportions

for half an ounce of pyro. The basis will now be one commercial ounce of pyro as sold in bottles, and which generally contains exactly 437 grains.

The sulphite of soda in crystals, when dissolved, yields one ounce of water to every two ounces of the salt : hence allowance has to be made for this in adding water, in order that the pyro in the completed solution will be equivalent to 48 grains to the ounce, or what is commonly termed a ten per cent. solution. One dram, being one-eighth of an ounce, will contain just six grains of pyro. Ten minims will contain one grain of pyro.

Thus, by a ready and easy calculation, the amount of pyro desired to be added to the developer can be at once ascertained.

To develop a  $5 \times 8$  plate, add to two ounces of water 40 minims of No. 1 and one dram of No. 2. With most plates the amount of No. 1 stated will produce soft, easy-printing negatives ; it may be doubled or trebled if greater density is desired.

Should the plate have been over-exposed, a quarter to half a dram of No. 2 is added, and also 1 grain of bromide of potassium.

With this treatment, should the image appear too slowly, increase the quantity of No. 2 by degrees until the proper speed of development is attained. The potash should be poured into the measurer, then the developer from the tray mixed with it, and the augmented solution re-poured upon the plate.

Under-exposure is remedied by the addition, by degrees, of as much as half to three-quarters of an ounce of No. 2 to the 2 ounces of water.



If the image appears too thin when viewed by transmitted light prior to fixing, then the quantity of pyro should be increased.

In using the dry pyro with No. 2 solution, 1 ounce more of the sulphite of soda should be added to solution A, in order to counteract the greenish tinge which would otherwise appear in the negative.

The pyro solution works well with the yellow prussiate of potash developer recently introduced.

The standard developer, as given, is made up by dissolving the chemicals in the following order ; each ounce must contain 480 grains :—

#### No. 1.

Water	...	...	...	...	...	32 oz.
Yellow prussiate of potash	...	...	...	...	...	3 oz.
Carbonate of soda (granulated)	...	...	...	...	...	3 oz.
Carbonate of potash	...	...	...	...	...	3 oz.

#### No. 2.

Water	...	...	...	...	...	32 oz.
Sulphite of soda (crystals)	...	...	...	...	...	3 oz.

The developer, as recommended for normal exposure, is prepared by adding to  $1\frac{3}{4}$  ounce of No. 2,  $\frac{1}{4}$  ounce of No. 1 and 4 grains of dry pyro.

In place of using the 4 grains of dry pyro, 40 minims of sulphurous acid pyro solution will give excellent results.

As an illustration of the energetic character of the "standard" No. 1 solution, Mr. Beach gives an account of

an interesting experiment. He gave an exposure of five minutes upon a well-illuminated object, some parts of which were extremely black. The plate (a very sensitive one) was evidently greatly over-exposed. To  $2\frac{3}{4}$  ounces of the No. 2 solution (sulphite of soda) he added 6 grains of dry pyro,  $\frac{1}{2}$  grain bromide of potassium, and 3 drops or minims of the No. 1 (yellow prussiate) solution. The development proceeded gradually, and in a very few minutes every detail came out; the resulting negative was extremely perfect and clear, and the experiment demonstrated beyond a doubt the value of this method of development.

The quality of negatives obtained by the potash developer is unsurpassed. Its easy and certain working makes it well adapted for use by the amateur.

Mr. Beach has kept the solutions for eight months, and found they worked (when mixed) just as perfectly and vigorously as when first prepared.

He does not think the potash has any special advantage in developing power over carbonate of soda; its advantage being that the image keeps more clear during development, and the solution is less bulky, and therefore more easy to handle.

On this account it makes an excellent developer for beginners, whose reports of its serviceability have been universally favourable.

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## Negatives on Paper.

WHILE mechanics have been devoting their best efforts to the production of different contrivances, in order to make photography easy and pleasant to the worker, experimental chemists have been busy in devising new methods of securing the photographic image. The ordinary manner of taking a picture upon a plate of glass—simple as it is—has had, and will always have, one slight drawback. Glass is a heavy material, and a brittle one; inventors have, therefore, for a long time been endeavouring to produce some substance which, while acting as a support to the gelatine film, will be of little weight, and will not be brittle like glass. Negatives taken on paper were produced, as a matter of fact, before glass came to be the sheet anchor of the photographer, and, as if to remind us of the saying, “History repeats itself,” the use of paper for the same purpose is once more coming into vogue. By a slight modification of the ordinary camera arrangements these paper negatives can be easily taken,

Before describing the exact method of using paper in lieu of glass as a support for the photographic image, it may be as well to point out a few of its advantages. It has always been a difficulty inseparable from the prosecution of photography that the weight of glass, the principal material used, is so great. The gain in using paper negatives in this

direction alone is very apparent, for sufficient material for taking one hundred pictures would only weigh a few ounces, if paper be chosen, whereas, for the same number of glass negatives, the material would weigh many pounds. There is also one distinct advantage in using paper negatives which is worth while pointing out. Every one will have noticed that in an ordinary glass negative the shadow portions of the picture which come near the high lights are blurred. This is more noticeable in the picture of an interior where there is a window or windows in the composition. These windows, instead of being clear, as they are in reality, are blurred into a black mass, which spreads itself on the adjacent shadows. This fault is known as "Halation," and is due to certain reflections from the back surface of the glass. It is true that the difficulty can be obviated to a certain extent by coating the back of the prepared glass-plate with burnt sienna or some other compound which will destroy its reflecting surface, but such modes are at the best only makeshifts. Now, a paper negative, having no such reflective surface behind it, is absolutely free from this fault of halation; and, if only for this reason alone, paper negatives, for certain purposes, must always be chosen in preference to those on glass.

There is another great advantage in the use of paper negatives. Parts from one negative can be cut out with scissors and inserted in another one. A picture with that photographic abomination, a plain white sky, can, by the aid of another negative, be furnished with sunlit clouds. There are many other modes by which negatives can be cut and pieced about with advantage which will readily occur to the reader. Photographs so treated are called



“combination pictures,” and although produced with success on the ordinary glass plates, the work is by no means so easy as it is when we come to deal with paper.

Negative paper is supplied, in sheets of different sizes, ready to insert in the ordinary dark slide of the camera; and frames which keep the paper taut and in its place are purchasable for insertion in the slides. Beginners with this interesting process are advised to feel their way in this manner before they proceed to purchase more expensive apparatus, not that the apparatus is really very expensive, but it is always as well to learn to walk before we attempt to run.

Another method of employing paper for negative work is by means of what is called a roll-holder, or roller-slide—a picture of which is annexed. This consists of a case very little larger than two ordinary double backs placed together. As will be seen by the sketch, shown with the back removed, it contains two main rollers, one of which is called the “measuring roller” and the other the “receiver,” while a roll of unexposed paper lies between the two. This roll of paper is continuous, and is sufficient for thirty pictures or more, which can be detached from one another just previously to subsequent development. To the receiving-roller is attached a kind of fixed key, and by turning this, with certain precautions, a length of paper,

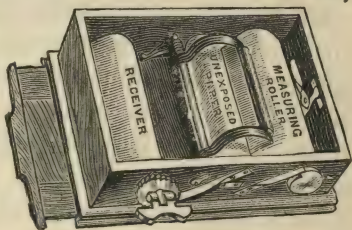


Fig. 30.—The Roller Slide.

sufficient for one exposure, is rolled out, and lies immediately below the exposing shutter of the holder. This shutter is shown in the sketch, partly open. It is needless to say that the roll-holder takes the place in the camera of the ordinary double-back; indeed, it may be said to take the place of fifteen double-backs,—that is to say, when it is fitted with sufficient paper to provide for thirty exposures.

Let us just glance for a moment at the wonderful convenience afforded by this arrangement. Take the case for instance of a tourist, whose steps are bent towards Switzerland, where most of his time will be spent in climbing. It would be quite out of question to take anything but the smallest camera, under ordinary conditions, on such a tour, without occasioning the greatest distress to the traveller. But, with this roll-holder, quite a large-sized camera—such as a whole-plate one—can be taken without any great strain upon the muscles of one's arm. The camera itself is light enough, and this roll-holder, furnished with sufficient paper for the number of exposures indicated, is by no means a heavy burden. With camera and roll-holder,—the two only weighing two or three pounds,—the tourist is equipped for taking large pictures of some of the grandest scenes which Nature affords.

Let us now suppose that our tourist has arrived home, and that he is desirous of developing some of his paper negatives. In the dark-room, he removes the long band of exposed paper from the roll-holder, and cuts it into lengths; the places where these cuts should be made are readily discernible by a prick which is made in the paper automatically during exposure, or rather every time that a

length of paper is rolled out for exposure. Taking the first piece so detached, he immerses it in water until it is quite limp, and, at the same time, brushes it over with a flat camel-hair brush, so as to remove any adherent air-bells. It is now placed in the developing-dish, and treated with a developer, made as follows :—

## STOCK SOLUTION.

Sulphite of soda (pure) .....	8 oz.
Boiling water .....	16 oz.

Dissolve and add,—

Pyrogallic acid.....	1 oz.
Pure carbonate of soda .....	4 oz.

The above solution will keep well if it is kept in a stoppered bottle. For development, take one part of the above solution to four of ordinary water, and pour it over the picture. And now the same rules govern the development of a paper negative as are necessary in the treatment of an ordinary gelatine plate. If the image is slow in coming out it must be accelerated by a little of the alkali,—viz., the carbonate of soda solution; but if, on the other hand, it shows signs of over-exposure, by flashing out with undue celerity, it can be checked in the ordinary way by a few drops of bromide of potassium solution. ?

It is not quite so easy to gauge the density of a paper negative as it is to judge of a glass one. In both cases the image must be looked through towards the red light, but remember that in the case of paper we have a semi-

opaque body backing our film, instead of one which, like glass, is absolutely transparent. The paper is fixed in the usual manner by immersion for a short time in a bath of hypo,—strength, four ounces of hypo to a pint of water.

It sometimes happens that the negative shows stains; these can easily be removed by a few seconds' immersion in a clearing-bath, composed as follows:—

Alum .....	2 oz.
Water .....	1 pint.
Hydrochloric acid .....	1 oz.

All the precautions necessary in washing a glass negative are as requisite, or nearly so, as in the treatment of paper negatives. It is true that the absorbent paper will allow the washing water to attack the film from both sides; but still it may be said that too much washing is an impossibility. It is in the drying of the film that a new departure is found. We must not dry a paper negative in the same way that we should dry an ordinary silver print, for were we to adopt such a method the film would cockle up and be absolutely useless. It must be dried while in contact with some flat and rigid surface. Glass which has been polished with powdered talc, or French chalk, will answer the purpose; or, better still, a sheet of ebonite can be used. This can be readily purchased, and it has the merit of requiring no preparation whatever. The negative is taken straight from the washing-water, and while still wet is laid, film-side down, on this support. The two are then covered with a piece of



india-rubber cloth, and the squeegee is applied firmly above it in order to ensure contact between the negative and the ebonite surface. If necessary, two negatives can be attached to a single piece of ebonite, one on each side.

The paper film must be allowed to dry spontaneously, and no attempt must be made to remove it from its support until it is thoroughly dry, it will then come off without any difficulty whatever.

If only one or two prints are required from the paper negative, it can be placed in the ordinary printing-frame as soon as it is dry, and without any further preparation; but the thickness and want of transparency in the paper will cause the printing operation under such conditions to be exceedingly slow, especially in dull weather. If, therefore, a number of prints are required, and time is of importance, we must adopt some means for making the paper translucent. A number of different substances and preparations have been recommended for this purpose. Castor-oil was one of the first, but this is messy, and unpleasant to use; and, what is more, requires heat for its application to the paper. There is a preparation called vaseline-oil, which is very much better for the purpose, and far less disagreeable to meddle with.

The following mixture has lately been published as a good thing for making transparent paper negatives, but we cannot say from experience that it is effectual. However, it is worth a trial:—

White paraffin wax .....	6 oz.
Petroleum .....	2 oz.

This should be dissolved like glue in a saucepan of hot

water. It is applied, after it has become cold, with a piece of rag to the back of the paper. The negative is then held to the fire for a short time, placed between two thicknesses of blotting-paper, and afterwards put under pressure. When the negative or negatives have been removed from the printing-frame, and are, for the time being, done with, they should be preserved in oil-silk covers, or in envelopes made of paper which has been treated with paraffin wax.

Recently, several so-called films have been placed on the market, but these have not yet been sufficiently tried to warrant recommendation of any one in particular; but there is little doubt that there is a great future in store for the principle which they represent. Some of them are partly composed of paper; some are known as "stripping-films," so called because, although they have before exposure a paper backing: this paper is separated from the film before the operation of printing, and, therefore, there is no semi-opaque paper to interfere with that operation. Further information concerning these films can be obtained of the Company.

## Quick Printing by means of Bromide Paper.

ALL amateurs agree in saying that the difficulties of photography, after they have learned preliminary operations, commence when they begin to print from their negatives. Sometimes the toning bath will, from some undiscovered cause, go wrong, and it seems to be quite impossible to persuade the red-brick-coloured print, as it comes from the printing frame, changing to that purple tone which we all so much admire. For this reason any process which will do away with the necessity of toning, and which will at once afford pictures of a pleasing colour, is a desideratum that few will despise. By the aid of gelatino-bromide paper these difficulties are at once obviated. This paper has all the qualities of a gelatine plate, except that the emulsion is spread upon a flexible support instead of upon glass. It is also generally made somewhat slower in action, and this gives us a distinct advantage in using it. At the same time it is quick enough to give a print when exposed under a negative in the printing frame to gaslight, or to paraffin or candlelight, if gas be not at hand. It is supplied in the ordinary photographic sizes, and it is also made in three different forms, so that we can produce a picture upon a smooth, thin paper, or upon a medium paper, with a certain amount of grain,

or upon a rough surface-paper like that used for water-colour drawings. This latter presents a great advantage, for the surface is of such a nature that it can be worked upon in water-colours, oil-colours, or crayons. We can, therefore, finish our picture in any way we like. It is advisable not to attempt to use daylight for this kind of printing, unless the negative should happen to be of extraordinary density. Gaslight will be generally found sufficient for all needs. A paraffin lamp gives a somewhat whiter flame, and the exposure made by that means is rendered somewhat shorter; but in any case it is only a matter of seconds, and so there is no great advantage in using paraffin over gas. In this kind of printing it is better to over-expose rather than under-expose, for the rule holds good here as it does in the production of a negative, that over-exposure can be remedied by after-treatment; but an under-exposed picture is generally good for nothing.

Before we attempt to apply the developer, the paper must be made thoroughly limp by soaking in cold water, and we must adopt the same precautions that we found necessary in the development of paper negatives,—in removing air-bubbles by means of a camel's-hair brush. The paper should be carefully soaked, and not merely wetted, for to obtain the best results we have not only to moisten the gelatine surface, but to render the paper upon which it is placed perfectly wet. Another precaution that it is necessary to adopt is to change the water used for soaking between every two or three pieces of paper developed. Indeed, it is best to soak every piece in fresh water. The development is nearly always brought about by the ferrous oxalate formula or some modification of it,



and seldom by pyro. The oxalate solution is always rendered distinctly acid, but it is not necessary to give exact details in this place, as these are given with each batch of paper purchased, and it is always best to follow the directions implicitly which are supplied by the maker.

As in the case of glass negatives developed with this formula, more than one piece of paper can be developed in the same bath ; but we do not recommend that course. The expense is not great, and we may as well afford a fresh developer for each print ; indeed, it is necessary to do so if we wish to ensure the best results. But we can with advantage mix part of the developer last used with that freshly made up for the next print, so that after one piece of paper is developed, instead of throwing the spent developer down the sink, we can pour it, or, at any rate, part of it, into the developing cup to mix with the next batch made.

After development, the paper print is not washed ; but the developer is poured off and an acid solution is at once poured on to the paper. This precaution prevents the whites of the picture turning yellow, as they would be apt to do without it, from the deposition of the iron salt in the pores of the paper, but acid at once checks this tendency.

After allowing the acid solution to act for a minute or two, the paper, still lying in the dish, must be thoroughly washed under the tap, and this must be continued until the slight milkiness at first discernible completely disappears, and the water runs off clear. Next comes the fixing operation ; and here, again, we have recourse to our old friend hypo, and use a solution, *which must be freshly made*, containing 5 oz. of that salt to a pint

of water. The fixing operation should be continued for at least fifteen minutes, for we believe that upon this thorough fixing depends in a great measure the permanence of the prints. The hypo bath should not be used for fixing more than about half a dozen prints, and directly it shows signs of becoming discoloured, it should at once be rejected and a fresh bath mixed. This salt is so exceedingly cheap, that the expense of such a proceeding is not worth consideration. The washing which follows fixing must be most thorough; and let it be remembered that to secure this thorough washing, changes of water should be frequent at first, after which the print can be allowed to remain soaking for some time in a deep vessel of water, and should be changed at intervals. The prints can afterwards be hung up by clips to drain, and allowed to dry spontaneously. We may take off a little of the surplus water from the back of the paper by means of blotting-paper; but the prints should not be blotted on the film side.

Pictures produced by this process may be looked upon as being permanent. A discussion has lately arisen concerning this matter of permanency; and, while some claim that the picture will be as permanent as the paper upon which it rests, others affirm that, like all silver compounds, the image must be looked upon as an unstable one. This question can, of course, only be settled by lapse of time; but we are in a position to say that we have seen prints produced by this method five years ago, which certainly show as yet no signs of fading.

These gelatine-bromide prints have all the appearance of platinotypes. At a recent technical meeting of one of

the photographic societies, several prints produced by both these methods were handed round the room for the inspection of those present, and experts were quite unable to point out which prints were produced by the bromide process, and which were due to platinum. At recent exhibitions, too, where examples by both these methods have been shown in plenty, it has been quite impossible to tell the one from the other. The main advantage in this method of printing lies in the fact that they can be produced by artificial light, and therefore quite independently of the fickle light of the sun. The necessary exposure in the case of a normal negative is about ten seconds if the printing-frame be held at a distance of one foot from an ordinary bat's-wing gas-burner.

Another description of printing surface has been introduced of late years, and the pictures produced by the method about to be described are full of softness and delicacy. This process is known as printing on opal. Opal glass, resembling in appearance translucent porcelain, is prepared by being coated with gelatino-bromide emulsion; in fact, the preparation is just the same as of the paper just described, and the method of development is also the same. The opal plate is exposed beneath a negative in a printing-frame to artificial light, and is developed in the same manner as a paper print. Full details of the operations required are supplied with these opal plates. They are particularly serviceable for portraits, and, when elegantly framed in plush, they form very beautiful ornaments for the walls of a drawing-room, and, if tinted, resemble in appearance the ivory miniatures which used to be so fashionable in olden times.

## New Apparatus and Processes.

THE modern amateur has many advantages, which those who took up the art of photography a few years ago did not possess. Apart from the convenient form and splendid efficiency of the apparatus which he can obtain, he has at command numerous appliances which were not even dreamed of in the early days of the art. Among these may be reckoned that outcome of the rapid gelatine plate called the instantaneous shutter, many examples of which we have described and figured in a previous chapter. These shutters fit tightly on to the hood of the lens, and it must be distinctly understood that what are known as "instantaneous pictures" are impossible without their use.

Another piece of apparatus which will be found a valuable aid to the amateur has recently been introduced by the Company, in the shape of a Patent Tripod Top. Its purpose is to allow the camera to be pointed in any required direction. *See annexed figures.*

Instead of being made in one piece, as such tops usually are, it is in two pieces, one above the other. In the lower portion a sliding board runs, which is hinged to the upper half; this enables the camera to be turned instantaneously on its side for the purpose of taking upright pictures. By using the sliding piece already described, the camera is brought central over the legs of the tripod, the structure



remaining perfectly rigid. Another advantage gained by this contrivance is, that by turning the camera when fixed by the **T** screw to the tripod top, so that the lens points upwards, photographs may be readily secured of the beautiful ceilings to be found in many of our ancient

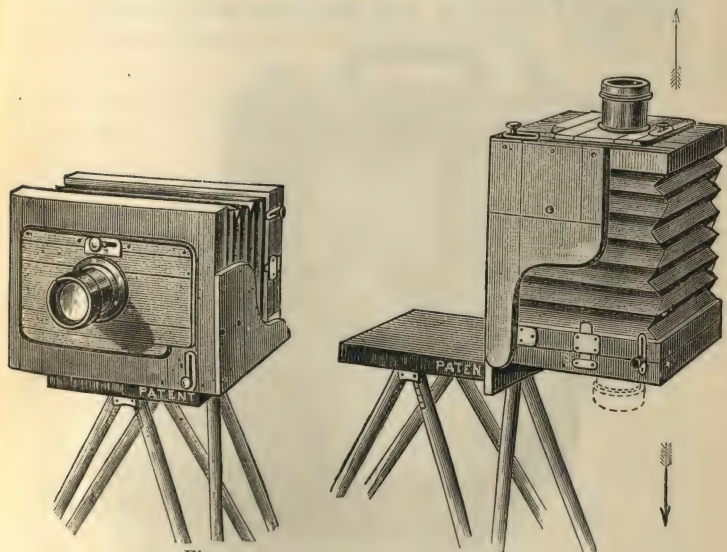


Fig. 31.—Rayment's Patent Tripod Top.

and modern buildings, thus meeting a want often experienced.

Again, should a drawing, map, or other such design require to be copied, it can be easily accomplished by reversing the position just described, and pointing the lens downwards towards the floor, where the object is spread out between the legs of the tripod.

The following remarks, which are quoted from the

*Amateur Photographer*, apply to another novel photographic appliance recently invented :—

“The most successful patents are those which, when patented, strike the public as being the most simple, and it is these very simple inventions that are made commercially successful. There are many inventions which are greeted



Fig. 32.—The Patent Photographic Gladstone Bag. The Semper Piratus.

with the words, ‘What an extraordinary thing nobody thought of it before.’

“The patented invention now under notice is a case in point.

“The Patent Photographic Gladstone Travelling Bag, which the London Stereoscopic and Photographic Company

Limited, have just brought out, 'is a capital idea. In actual appearance the bag is nothing more than an ordinary travelling-bag—a bag with which one pays a visit, say from Saturday to Monday. And so indeed and in fact it is, for there is room in it for a dress suit, clean shirt, and the ordinary necessities of the toilet. In addition to fulfilling this useful function, it contains a complete photographic

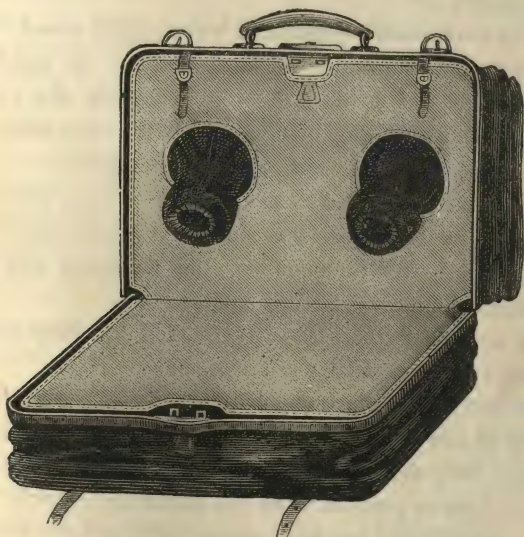


Fig. 33.—The Patent Photographic Gladstone Bag, or Semper Piratus.

outfit—camera, lens, tripod, plates, chemicals, non-actinic lamp, dishes, &c. (*see illustration*). These articles are securely and neatly arranged in compartments on the diaphragm dividing the bag into the usual two parts. But the main and striking feature of the bag is the manner in

which one of the expanding sides is modified to serve the purpose of an excellent and reliable changing-tent. The bag supplies a distinctly-felt want, and, having inspected it and its contents quietly at home, we are able to recommend it for two purposes,—as a first-class and useful Christmas present, and as the very thing for those amateurs who, on their rambles, do not care to be taken for itinerant professionals.

“The workmanship throughout is thoroughly sound. The amateur photographer appreciates nothing so much as compactness and good work. We feel that the Photographic Gladstone Bag, being a step in the right direction, will become popular among travelling amateurs.

“We have been asked to mention that in cases where the purchaser, or the person for whom the bag is purchased, is unacquainted with photography, the Company will give gratuitous instructions in their studios.”

We now refer to what may be called the most recent advances in the chemistry of photography.

The best service which the chemist has rendered to photography of late years is the production of a new method of printing from the negative, by which the positive pictures obtained are as permanent as the paper upon which they rest. We all know how early photographs were apt to fade into yellowness, and although this need not be the case if the printing is executed with care, and by experienced hands, the ordinary silver process is not to be relied upon for permanence. The new method to which we refer is called the Platinotype process; and pictures produced by it are so tenacious of their pristine vigour that the strongest acid will not hurt the image, while it will destroy the paper



upon which that image rests. The process is not quite so easy as the older one, but any amateur can master its details without much trouble. Particulars of working are furnished with the materials supplied for producing prints in platinum, but the following account of the process, recently contributed to *Cassell's Technical Educator* by a well-known writer, gives a capital *resumé* of the necessary operations:—

“Ordinary photographs, by which we mean those printed in silver as described in the last article, are unfortunately not always as permanent as they should be. There is more than one reason for this, but that the failure exists must be apparent to any one who possesses pictures which are only a few years old. Many of these have probably turned to a sickly yellow tint, and are mere ghosts of what they once were. The most common source of fading is incomplete washing, for if the fixing salt is not entirely eliminated, the prints will quickly lose their early bloom. Another cause of fading is found in improper media for mounting the prints, and very often may be traced to some chemical which has been ignorantly used in the preparation of the mounting card itself. Many collectors of photographs are aware of this, and obviate the difficulty by securing the pictures in their albums by the corners only. However, the risks of fading are so many that numerous experimenters have endeavoured to find some more stable compound than chloride of silver for printing purposes. The foremost of these methods in the present day is known as the Platinotype process, now to be described. Many workers have adopted it, not only on account of its undoubted permanence, but because of the economy of time which it presents when contrasted with

the silver method. The troublesome hyposulphite of soda is entirely dispensed with, and the tedious washing operation is reduced to a mere rinsing. The sensitised paper contains salts of platinum and iron. After being exposed under a negative for the requisite time, it is developed in a dish containing a hot solution of oxalate of potash. It is then immersed in a weak solution of hydrochloric acid, and finally in plain water. The operation is then complete.

“The insidious foe against which the platinotype worker guards at every step is damp. Not damp in the ordinary sense of the word, but the invisible vapour always present in the atmosphere even on the finest days. The paper is supplied by the manufacturers rolled up in tin cases or tubes. At the top of the tube is a perforated box containing chloride of calcium, a salt with such an affection for moisture of every kind that it will quickly absorb every particle that may be present in its vicinity. The joint of the tube where it opens is further provided with an india-rubber band which covers it, and so keeps out the foe. When the calcium becomes damp from long use it can be dried over a fire upon a shovel, and replaced in its tube. Even when in the printing-frame the paper must be protected from any damp lurking in the pads by interposing between it and them a piece of thin vulcanised india-rubber. The same precautions are necessary after exposure, for the paper is then quite as susceptible to moisture as it was before. After exposure, therefore, if not at once developed it must be replaced in a calcium tube until wanted. Should these precautions be neglected the prints will exhibit a want of vigour, general dulness of tone, dirty whites, and other

disagreeable features which will probably make the tyro blame the process, when the fault really lies at his own door.

"The paper may be said to be more sensitive to light than ordinary albumenised paper, for in dull weather a picture may be fully exposed in a third of the time that a silver print would require. Before exposure it is of a lemon-yellow tint, but it changes under light to a pale greyish-brown. And here the beginner will experience some difficulty in knowing when exposure must be stopped, for it must be understood that the picture under any circumstances is at this stage exceedingly faint. A few experimental exposures will, however, soon put the matter right. Like all other processes in photography, the best negatives will give the best prints, but the most suitable negatives for this particular process are those which are rather intense, and possess plenty of gradation of tone. Indeed, a negative which will give rather a hard print in silver will often yield a much better result in platinum.

"For development, an iron enamelled dish is required, standing on a suitable tripod support, so that underneath it may be placed a Bunsen burner, or, where gas is not available, a spirit lamp. The developer may be made in bulk, for it does not spoil by keeping. It is made by dissolving 130 grains of oxalate of potash for every ounce of hot water used. To develop a print the solution is poured into the dish, and the flame is lighted underneath until the thermometer registers  $170^{\circ}$  to  $180^{\circ}$  Fahr. This is about the normal heat necessary, but under certain conditions it may be raised or lowered with advantage. Thus, prints which have been over-exposed may be turned into

good pictures by lowering the temperature of the developing solution, whilst those suffering from the opposite fault may be advantageously treated with a much hotter solution than the normal.

“Care must be taken in dipping the prints into the developing dish (which should contain enough solution to give a depth of at least a quarter of an inch) to avoid bubbles. The best way of accomplishing this is to bend the paper sensitive surface downward, so that one edge touches the liquid first. The rest of the paper can then be drawn over the surface with one even movement. The paper must remain floating for about five seconds, and can then be removed. If all has been properly done, the weak, grey image has now assumed a brilliant black.

“The prints must now be cleared and washed. The clearing solution is merely hydrochloric acid (pure), mixed with sixty times its bulk of water. At least three dishes of this acidulated water should be placed before the operator. In the first, the prints should be placed face downwards, immediately after development, for about ten minutes. They are then removed to the second dish for a similar period, and after that to the third bath. But, should this last bath exhibit the slightest trace of colour after the prints have been immersed in it, a fourth bath of the acid water must be used. Under any circumstances, this last bath should be always fresh for every batch of prints. But baths which have been used for previous batches may be used again as first baths for subsequent ones. The object of these acid baths is to remove every trace of iron from the paper, and unless every trace is so eliminated, the purity of the whites is sure to suffer in the



finished pictures. If the pictures are left for more than the stated time in the acid baths—that is to say, if they are left therein for an hour or more—the image is not necessarily affected, but the paper becomes soft and porous, and very difficult to handle. Moreover, by such prolonged manipulation, the surface may be injured by abrasion, and this must be guarded against throughout all the necessary operations. The silver-printer may be tempted to place platinum prints in plain water immediately after development, but on no account must this be done. They must be transferred direct to the first acid bath.

“The same developer will serve for quite a large number of prints, and even then it must not be looked upon as a waste product. After a batch of prints has been treated with it, it should be transferred to a bottle for another occasion. The bottle should be kept in a cupboard away from the light, for access to strong light for any lengthened period is prejudicial to the developer. Green crystals will probably form in the liquid, and it should be carefully decanted from these, fresh oxalate of potash being added from time to time to keep up the original bulk of solution.

“The special advantages claimed for the platinotype method of printing from photographic negatives are as follow:—

“If proper precautions are observed, as indicated in the foregoing observations, the paper will keep well in good condition for a lengthened period of time. The results are absolutely permanent. Indeed, the metallic platinum forming the image is about the most lasting substance known to chemists. It will resist the action of all chemi-

cals with the exception of hot *aqua regia*, and we need hardly point out that this is a compound not likely to be brought into contact with a work of art. One special advantage the paper has in forming a suitable basis for the work of an artist, it is not affected by any pigment placed upon it, nor will it have any injurious action upon any colour placed above it. Artists will especially appreciate the effects produced, for a good platinum print has the appearance of a fine engraving, both in quality and colour. The non-artistic eye is so used to the warm-toned, glazed surface of an ordinary photograph in silver, that to some it may appear that the new process is cold in comparison; but the true artist will appreciate the difference, and in time, perhaps, the general public will do so too. Next, we have to consider the great gain in time possible by the platinotype process. The entire operations can be completed under favourable circumstances in about half an hour; toning and fixing being entirely dispensed with. In silver printing, the necessary washing alone is a process occupying the best part of a day, and even when all care has been taken in this respect there still remains the question of doubtful permanence. This method of printing is not only applicable to paper. It can be adapted to different descriptions of textile fabrics, and thus it opens up a new field for photography in various departments of decorative work. To point out one illustration of its use in this direction, we may state that engineers can have their plans and diagrams printed upon linen cloth, and that such plans will bear rough usage with impunity. Photographs printed upon fabrics in this manner can be washed with soap and water without receiving any injury.

"In speaking of the fugitive nature of silver prints under certain circumstances which are only too likely to occur, it may be mentioned that there has lately been introduced a new system of mounting, which, besides giving great beauty to the photograph treated by it, is certainly conducive to permanence. The system is not applicable to pictures intended for albums or for book illustration, for the support for the picture consists of brittle glass. For all framed photographs within a certain size, this method of mounting the paper in optical contact with the glass may be adopted. The print, after being soaked in water until flaccid, is drained and brushed over with a solution of starch, gelatine, or both combined. The glass, carefully cleaned, is also treated with a coating of the same mixture. The glass and picture are now brought together, and, by help of a squeegee applied to the back, the surplus solution, together with contained air-bells, is driven off to the edges. Spontaneous drying of the picture so mounted completes the operation."

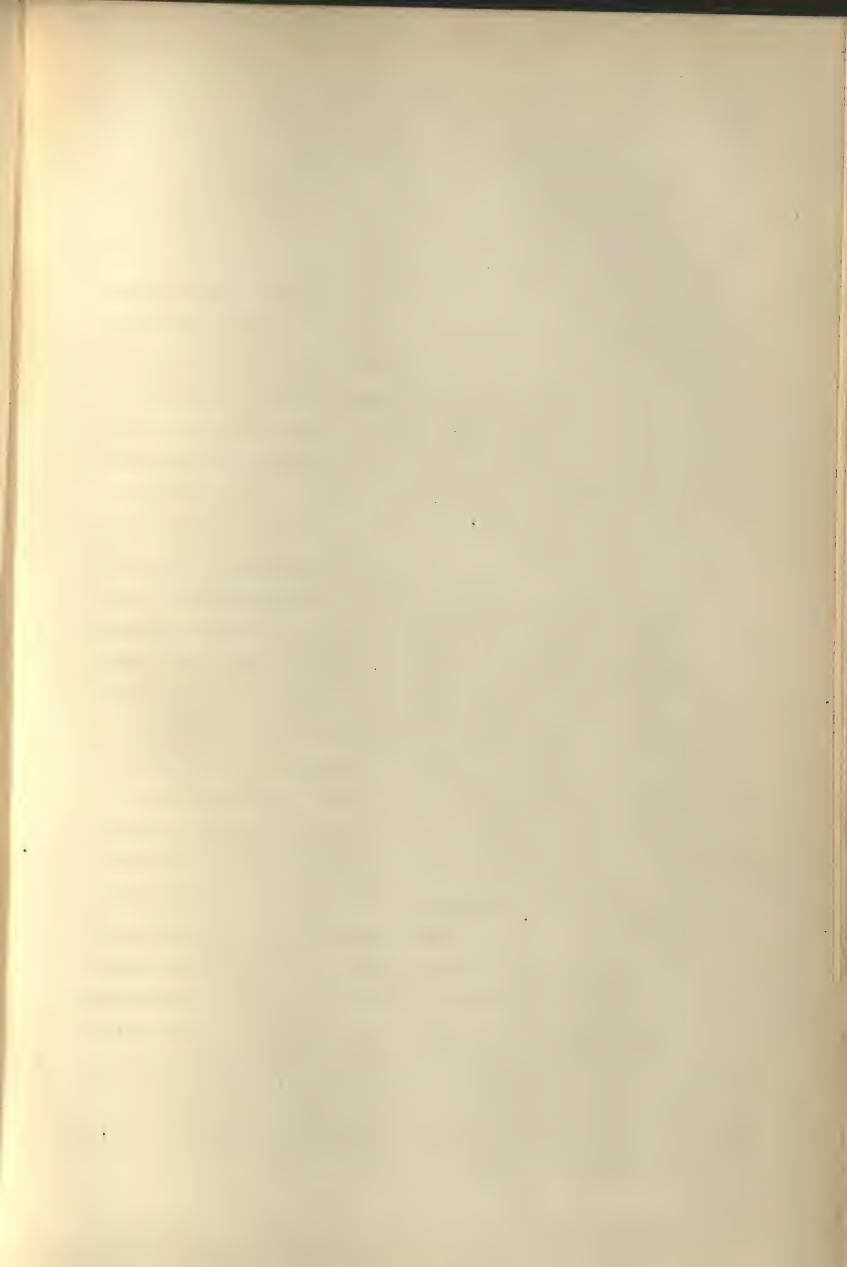
There is one other printing process which, although it is now some years old, is so effective in its results that it must not be passed over in silence. This is the carbon process. It depends for its efficiency upon the curious property conferred upon gelatine which has been charged with one of the dichromates of the alkalies, of which the salt commonly known as bichromate of potash is a good example, in becoming quite insoluble after being exposed to light. Gelatine so treated and mixed with a certain quantity of carbon, or other form of pigment, is exposed beneath a negative, and those portions which are affected by light become insoluble, whilst the remainder of the surface,



which is supported upon paper and is known as "tissue," retains its solubility. The developing medium is hot water, which quickly dissolves away all those portions of the tissue which have been unaffected by the light.

The carbon process, the principle of which we have thus briefly sketched out, is hardly suitable for amateurs, for it requires a somewhat extensive plant, and utilises appliances not found in ordinary photographic work. But its results are both permanent and beautiful, and, were it not that platinum and bromide paper put both these desiderata at the disposal of the amateur with far less complex operations, it might be desirable to consider it more in detail. As it is, the reader must refer to works which deal exclusively with the subject. As a proof that the work is not of a very simple character, we may call attention to the fact that at the exhibitions where carbon prints are often shown they are nearly always the work of some firm, such as the Stereoscopic Company, into whose hands the negatives are placed for reproduction in that form. A very beautiful modification of the carbon method is that known as the Woodbury-type process, by which prints, with all the beauty of silver-printed pictures, can be produced by the hundred or the thousand for purposes of publication. These prints, being in carbon, are absolutely permanent. The Company are prepared to give estimates for Woodbury-type pictures of any size, but they wish it to be distinctly understood that the process is only used when a considerable number of copies are required. In that case it is a cheap process, but for a small number of prints it is unsuitable, for the initial expense is in the preparation of the necessary mould, &c.







THE OLD MILL, TINTAGEL, CORNWALL.

(By Miss E. STONE.)—*Prize Medal.*

It is quite certain that the amateur can now produce pictures which will not only equal,—but in some cases will actually excel ;—the productions of the professional worker. That this statement is no dream is proved by the following photographs selected from the prize pictures at the last Amateur Photographic Exhibition. They appeared in their present form as a supplement to the *Queen*, the ladies' newspaper, for these photographs are the work of ladies' hands. It must be remembered that, although these reproduced pictures in a form fit for the press are the best of their kind, they cannot do justice to the high finish and delicate softness of the original works. We quote the following passage from the article in the *Queen*, which accompanied the illustrations :—

“PRIZE PHOTOGRAPHS IN THE LADIES' CLASS AT THE LAST AMATEUR PHOTOGRAPHIC EXHIBITION. — The extreme difficulty of having photographs satisfactorily reproduced in black and white is the reason why the publication of the present supplement has been delayed. However, many of our lady readers who are engaged in the now so fashionable pursuit of amateur photography will be interested to see the degree of perfection in which representations of objects of interest can be obtained with the aid of recent improvements in photographic processes and apparatus. Our facsimile specimens embrace a wide range of subjects, figures, animals, landscapes and interiors, and each of them shows the consummate skill with which the capabilities of the camera have been turned to account.

“The grouping of figures against a suitable background for photographic purposes requires thought and discrimination,

as well as educated taste, and only real artists can produce photographic pictures like those done by Lady Roscoe, the Hon. Maude Lawrence,\* and Miss Sullivan. For land and seascapes all depends on the judicious selection of the spot where the camera is to be placed, to insure picturesque effect. The gradations of light, as they appear on the various objects in view, have to be carefully watched, to catch the right moment when to draw the slide. In both respects Miss E. Stone, Miss F. Harvey, and Mrs. West in her 'Study of Horses,' have succeeded admirably; whilst the 'Interior,' by the last-named lady, shows superior skill in reproducing the furniture and the ornaments of a modern room in their minutest details with remarkable distinctness.

"All praise is due to the London Stereoscopic Company for promoting and popularising, by their periodical exhibitions, amateur photography amongst ladies."

We have little to add by way of conclusion. These pictures speak for themselves, and tell us in a most emphatic manner what amateur photographers can accomplish. There is no special gift necessary for taking such pictures beyond those which an educated brain and a cultured mind have the advantage of possessing. We, therefore, advise the old and the young, the weak and the strong, to take up this beautiful art of photography as a pastime, and a relief from the worries inseparable from the ordinary duties of life. They will never regret having done so.

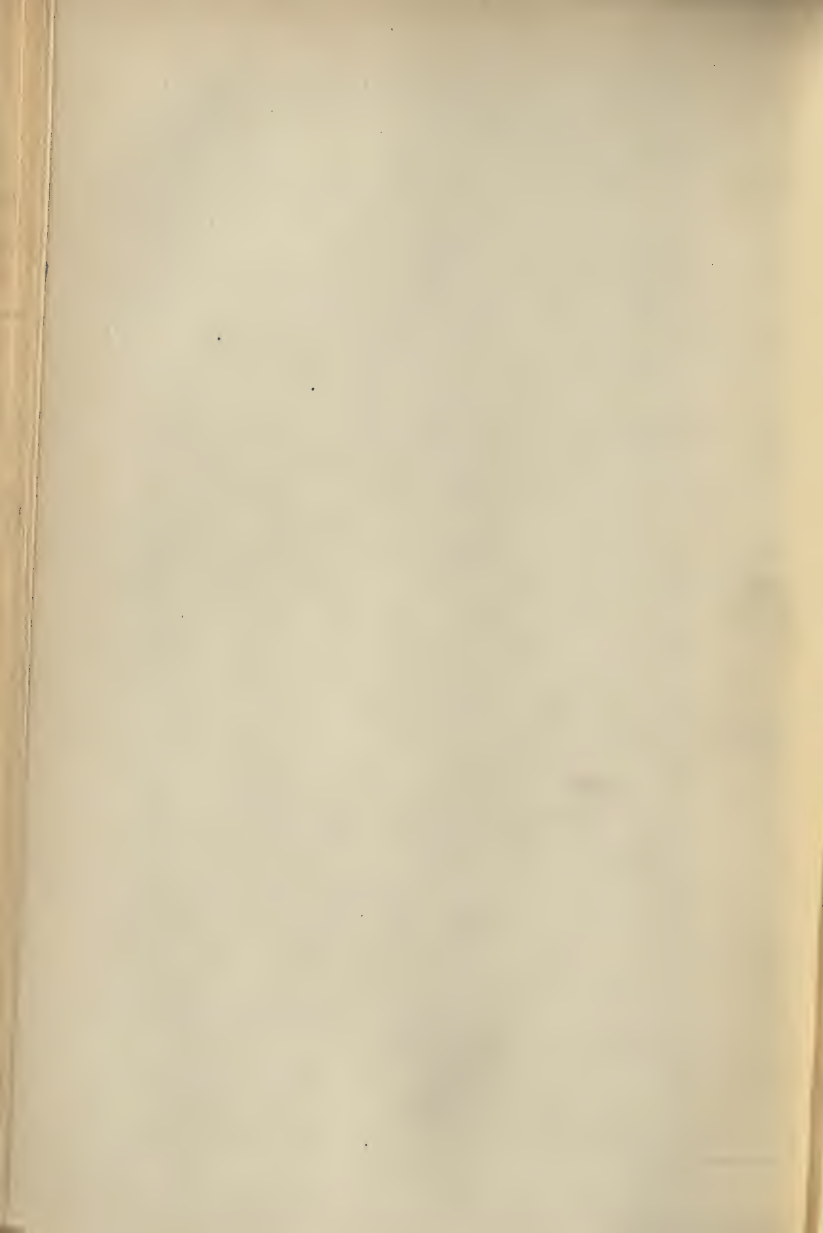
\* See Frontispiece.





VIEW OF CLOVELLY, FROM THE PIER.

(By Miss E. STONE.)—*Prize Medal.*



## OPINIONS OF THE PRESS.

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### "DAILY TELEGRAPH."

AMATEUR photography, relieved of all its unpleasantness by the cleanly dry-plate process, is now a deservedly fashionable pursuit ; and a handsome folio, published by the London Stereoscopic Company, shows what can be done by help of their apparatus and instruction.

\* \* \* \* \*

Indeed, peripatetic photography is rapidly becoming appreciated as an institution, thanks mainly to the simplification of the art and of the means of the London Stereoscopic Company, of Regent Street and Cheapside.

### "MORNING POST."

THE London Stereoscopic Company, to whom the public are already indebted for so many charming scientific novelties, have just produced, in a neat and handy form, a complete photographic apparatus for the use of amateurs. It contains within small compass every requisite for the production of portraits, landscapes, and objects of animal and vegetable life, and with the view of making it more acceptable, the manufacturers place at their disposal, free of charge, their London studio, where persons desirous of acquiring the art may have instructions from those best able to impart it. As an amusement for a country house, or as a resource on a wet day, the apparatus will be found an interesting and useful subject for study.

"THE WORLD" says

THE London Stereoscopic and Photographic Company, which, with its agencies in various parts of the world, has developed into the largest concern of the kind, and which is familiar to the public as having given a greater impetus to the study of amateur photography, by the establishment of classes for gratuitous instruction in this new and fashionable art.

\* \* \* \* \*

By persons with a gift for it, amateur photography is soon learned. When last in England, the late Mr. CAMERON, of the *Standard*, procured some photographic apparatus of the London Stereoscopic Company, and availed himself of the gratuitous instruction given to such purchasers. He picked up enough knowledge to take some very creditable negatives—"The Head-Quarters at Dongola," "Lord Wolseley and his Staff," "Drilling Black Conscripts," and several others, which have been sent home through Cook's agency, and are now published by the Stereoscopic Company.

"PALL MALL GAZETTE."

CONSIDERING how simple the so-called art has now become, and what a lot of amusement may be derived from its pursuit, one is surprised that more people have not taken up this new and pleasant pastime, though, with the facilities alluded to, many will doubtless avail themselves of the "gratuitous tuition" that the Stereoscopic Company so liberally offer.

"GLOBE."

A FEW lessons at the School of Photography attached to the London Stereoscopic Company in Regent Street will enable any one with common intelligence to practise the art successfully.

"LADY'S PICTORIAL."

WHERE can I be taught to photograph successfully? To this we can give a ready answer. The London Stereoscopic Company, of 108 and 110, Regent Street, one of the oldest established houses in the



profession, remarking how very popular amateur photography had become, especially with our Transatlantic cousins, decided to open at the above address a studio devoted entirely to amateurs. This studio—which, we may mention, is both large and excellently lighted—has now been in existence for several months, and we have reason to believe that a very large number of pupils have availed themselves of the liberal terms offered by the Company, which include absolutely gratuitous instruction to the purchasers of their superior apparatus. The tuition is given privately, not in classes; the advantage of this to the diffident beginner is at once apparent. Moreover, by this system, proficiency is much more readily attained. We are confident that ere long photography will be regarded as a sure antidote for ennui,—a malady, we fear, to which many of the daughters of Eve are specially liable,—and that the day is not far distant when a set of photographic apparatus, so invaluable as a “kill-time,” will be considered indispensable to the complete appointment of our country houses.

#### “NATURE.”

It may interest many of our readers—especially those who would like to add to the pleasure of a tour by a little photography—to know that the London Stereoscopic Company give gratuitous private lessons to amateurs who purchase their apparatus from the Company. We have no doubt this will solve a prime difficulty in the case of many who are ambitious to be able to photograph on their own account, but who do not know how to take the first step.

#### “MAGAZINE OF ART.”

THE application of photography is now so extended and varied, and its practice is so simplified, that it appeals to all classes and professions. It is equally useful to the architect and the engineer, to the archaeologist and the sculptor, the painter of landscape and cattle, and the tourist who values the reminiscences of travel.

#### “SOCIETY.”

It is somewhat surprising, considering how much more simple photography has of late years become, that it has not grown more popular among amateurs.

## "KNOWLEDGE."

WE are able to testify to the thoroughness of their system of teaching, and the world-wide renown the Company enjoys is quite sufficient guarantee of the quality of their instruments, which are, it is only fair to state, marvels of compactness, and, furthermore, may be purchased at but little cost.

## "COURT JOURNAL."

THE very many persons of both sexes who engage in amateur photography will be pleased to learn that a school of instruction really worthy of the name has been opened under the auspices of the London Stereoscopic Company. The arrangements made are such as will highly commend themselves to amateur photographers, who, if they become purchasers of the specially-designed sets of apparatus, will receive lessons free of charge, and privately instead of in classes. There is no doubt that proficiency is much more easily gained by instruction in private; and modern photography is not such a complicated art that it cannot soon be learned by any person of ordinary intelligence.

## "COUNTRY GENTLEMAN."

MODERN PHOTOGRAPHY.—We notice, among our advertisements, one of the London Stereoscopic Company in relation to amateur photography. Our object in calling the attention of our readers to this advertisement is that it will for itself answer a question we repeatedly have put to us, and that is, "Where can I go to be taught photography?" Although there may exist such places, we did not know of any until the Stereoscopic Company opened a studio specially devoted to amateurs. Formerly photography, owing to the cumbrous plant connected with it, made the whole business more of a toil than a pleasure, but, on the abolition of this, the wet process, and the introduction of dry plates, the chief difficulties of the amateur vanished. Now all that he need understand is how to focus correctly and be able to judge the exposure properly, and these points, with a few minor details, can be acquired in a few lessons. We are supposing that our amateur photographer will get a professional to develop his negatives and print for him, but even this now is very simple. With this small amount of knowledge the neophyte can set out and secure the best souvenirs of the places visited, and we need hardly say that any

tour is greatly enhanced by having a series of pictures of the places through which one has passed. We have now before us some photographs taken by Mr. John Duncuft, whilst on a voyage in the steam yacht *Norseman* in the northern latitudes. Many of the negatives were not developed until some months after they were taken, and they are of especial interest, inasmuch as some of the views were taken at midnight by the light of the midnight sun. Some groups of Laplanders present a most picturesque appearance, and the photograph of a coasting vessel, taken from the deck of a yacht whilst steaming in an opposite direction, show how rapid dry plates now are.

The Stereoscopic Company, we understand, make no charge for instruction to the purchasers of certain sets of apparatus.

#### “WHITEHALL REVIEW.”

MODERN photography, with all its latter-day improvements, is so beautiful and useful an art that any effort to extend its sphere of utility should certainly receive encouragement from all classes. Amateur photography has long been regarded as a failure, chiefly owing to the complication of the apparatus heretofore employed and the want of a proper school or studio where the principles of the photographic art could be readily acquired. The London Stereoscopic Company, however, have obviated these difficulties by having opened, at 108 and 110, Regent Street, W., a studio exclusively for the use of amateur pupils, who, on purchasing a set of specially-designed apparatus, will be taught perfectly free of charge. It has also been sensibly arranged for all lessons to be given in private, a system which insures more rapid proficiency than class-teaching; while the instruction will be imparted by persons of the highest experience, thus enabling pupils, both ladies and gentlemen, after a few lessons and the comparatively small outlay involved by the purchase of the apparatus, to faithfully reproduce the many animate and inanimate objects which, either on their rambles or travels, may have created impressions of interest. The London Stereoscopic Company will, doubtless, obtain a well-merited success for the laudable endeavour to extend to the home circle the refining influence of a most pleasing art.

#### “CIVIL SERVICE GAZETTE.”

MODERN PHOTOGRAPHY.—We should think that even Mr. Ruskin is tolerably well satisfied with the progress which has been made in art in this country within the last few years. It is hardly too much to say that there is scarcely a home amongst the educated classes in which

some of the members of the family do not possess artistic proclivities, and are able to work in crayons, or water or oil colours, with an amount of skill which would have done credit to even some professional artists in the earlier parts of the century. Now, these artistic tastes not only go very far to refine a home, but to considerably enhance the beauty of the domestic surroundings. It is with very much satisfaction we observe, too, that a large accession has been made to the ranks of those who practise the beautiful art of photography. Now, very many of these are amateur photographers, who succeed, after taking a few lessons from competent artists, in acquitting themselves most creditably in an artistic light. We need hardly say that the charms of boating and other excursions of the kind, which are so numerous undertaken during the summer and autumnal months, are greatly increased if some of the members of the party are able to take views of the scenery and places of interest passed through, these being, of course, highly esteemed as souvenirs of delightful days passed amidst charming surroundings; and it is by means of the art of photography that such views can be most accurately and most expeditiously taken. Our readers, and numerous other persons, will be glad to hear that the London Stereoscopic Company, of 110, Regent Street, have made special arrangements with regard to amateur photographers, and, in order to meet their requirements, have opened a studio at their West-end establishment, where the very best instruction is imparted to photographic students. In fact, no charge whatever is made for instruction given to those purchasing the Company's specially-designed set of apparatus; and as all lessons are given in private, and not in classes, proficiency is more quickly gained. We should not forget to mention, too, that the London Stereoscopic Company supply sets from £1. 5s. upwards, suitable for juveniles, and also for children of a larger growth. It only remains for us to recommend those who are desirous of obtaining lasting records of their yachting cruises, boating excursions, cricket and lawn-tennis matches, and other gatherings, to obtain the necessary instruction and supply themselves with materials, which can be thoroughly depended upon; then will they be able to adorn their homes with numerous views of scenes and places in which some of the most delightful hours of their lives have been passed. Modern photography dispenses with all the cumbersome apparatus of former days, with tents, silver baths, &c. A small portable camera and a few dry plates are all that is required, and after pictures have been taken, their development can be made at home, or where the apparatus was purchased, where, also, the printing can be done and the pictures delivered mounted complete for the album or otherwise,



*"CASSELL'S FAMILY MAGAZINE."*REMUNERATIVE EMPLOYMENT FOR  
GENTLEMEN.

THERE is nothing, perhaps, that so much enhances the pleasure we naturally experience in visiting new and unfamiliar scenes as the power of bringing away with us pictorial presentments, more or less accurate, of their most striking features. For thereby the delight which they first imparted to our gratified senses can be renewed at will, and, to a certain extent, even shared by our friends. A verbal description of the places we have visited may be very well in its way, and in some cases be extremely vivid and intelligible, but who does not know how greatly the production of a sketch-book adds to the interest of such a description, however crude and imperfect the drawings may be? When the views presented for examination, however, possess the truthfulness and exactness of photography, the interest is oftentimes still greater, and our friends' ideas of the scenes represented will be rendered almost as accurate as though they had been with us in person and seen the various objects for themselves with their own eyes.

If, however, we are dependent on the local tradesman for our supply of photographic views, we shall in all probability have little to aid our recollection in the case of much that was beautiful in our travels. The only remedy for this defect is to become our own photographer, and thus to bring it within our power to carry away with us whatever views we most desire, and, if necessary, to multiply copies at a future time to any desired extent.

Many gentlemen have recently acquired a knowledge

of photography simply for this purpose, and to any one possessing a fair amount of artistic taste we can scarcely imagine a more interesting and delightful amusement. But there is no reason whatever why it should not be rendered something more than this,—why, in fact, it should not be brought, in the case of those who find it necessary to add to their limited incomes, under the category of Remunerative Employments. To those who have a fair knowledge of the art, and a tolerable amount of skill, there are ample opportunities of turning their talents in this direction to practical account. Photography is becoming more and more utilised, as time goes on, for purposes of pictorial illustration, not only in connexion with literature, but also in many departments of trade; and no doubt, as improvements are made in the processes employed, and the advantages of its use become more apparent, it will become even far more general than at present.

Just now, however, we are thinking of the more popular uses to which it has already long been put, and which are capable even yet of considerable extension, such as the taking of portraits of persons and animals, views of buildings, landscapes, &c.

There will always be a greater or less demand for these things, but dependent, as usual, on the facility with which the articles can be obtained. In town districts photography in all its branches is, of course, very largely and very generally patronised; but in the more remote villages and hamlets it has yet, as a rule, made comparatively but little way. And it is just in such districts as these that one finds in greater abundance than almost anywhere else subjects worthy of photographic reproduction. Should an itinerant artist by any chance be led to visit these out-of-the-way neighbourhoods, the excitement and interest displayed in his art are simply wonderful, and he has not

unfrequently more subjects exhibiting a laudable anxiety to "have their picture took" than he can,—on that occasion, at all events,—conveniently accommodate. The people at the "big house," moreover, often monopolise a large portion of his time, and he is kept busily employed in taking groups of "the family" in every available position, as well as portraits of their equine, feline, and canine friends, and other special pets and household favourites.

From this we may readily infer that even in such a matter as this the supply would, to a great extent, regulate the demand. An enterprising photographer might, indeed, we think, in these days of tricycles and other ready means of locomotion, do a large business in this way were he to set about it in a thoroughly energetic and business-like manner. It might for the most part, too, be carried on under circumstances largely conducive to health and enjoyment.

No doubt in many minds photography is associated with much that is disagreeable and repellent. But this is rather due to the recollection of the art as practised in the earlier stages of its history than to anything else. The slightest investigation into the more modern methods will serve to set the inquirer's mind at rest on this point. Formerly, it is true, the apparatus required was inconvenient and cumbersome, and the process then in vogue, now generally characterised as the "wet" method, involved the use of so many chemicals that it not only proved a source of considerable inconvenience and annoyance to the amateur who occasionally loved to dabble in the art, but also of much that was disagreeable and repugnant to his more accomplished *confrère*. Indeed, the whole system was marked by much of toil to its professors and little of pleasure.

During the last few years, however, the various operations have been greatly simplified. With the introduction

of the use of "dry" plates, ready prepared, the chief difficulties of the amateur have vanished, and the amount of necessary gear has been, so far as we are able to judge, already reduced to a minimum. Perhaps not the least of the many advantages accruing from the use of the "dry" plates are the following:—In the first place there is no longer any need for the unsightly stains which formerly, by the use of the "wet" plates, caused such disfigurement to the hands and clothes of the operator. Secondly, the "dry" plates need not, like the others, be at once developed after the exposure, but can easily be kept, for months if required, before this operation is performed. Lastly, there is very much less uncertainty about obtaining a good photograph, especially in the case of portraits, the time of exposure required being under favourable circumstances only the fraction of a second.

The advantage of the last point will be readily recognised, as even moving objects can be accurately photographed with the utmost clearness of outline, and with perfect freedom from that "mistiness" which too frequently marred even the slow products of the older process. Some beautiful instances of what may be done in this way were shown in the article we recently gave on "Instantaneous Photography."

The question now naturally arising in the mind of any reader who may wish to adopt photography, either as a profession or as a means of occasionally adding to his income, is this:—"Granted that your representations are correct, and that such an employment might be found in some degree remunerative, how am I to obtain such a knowledge of the art as will enable me to put it to a practical use? And will not its acquirement occupy a considerable period of time?" In reply to the first of these questions we may say we have just heard that the London Stereoscopic Company have recently made arrangements at their establishment in Regent Street for the special instruction of



amateurs. We mention this school merely for the information of our readers, as it appears to meet the ordinary requirements of the amateur, and the expense incurred is inconsiderable. Doubtless, however, there are schools of a similar kind and of equal utility in other places; and we advise intending students to make full inquiry before deciding.

The plan adopted at the Stereoscopic Company's School is to give individual instruction to the pupils, except in cases where two or more friends are learning together; and the charge is at the rate of two guineas for a course of four lessons.\* Such a course is in ordinary cases deemed amply sufficient; all that the student needs to understand at first being how to obtain a proper focus, and how to judge the amount of exposure that will be required under various circumstances. A knowledge of these points, with a few minor details, is in most cases readily acquired. Indeed, we are given to understand that any gentleman can, as a general rule, take pictures very successfully after one or two lessons.

Of course, a longer time is necessary if the student wishes at once to learn how to develop his negatives and do his own printing. But even these latter points have now been rendered extremely simple, and a competent knowledge of them may easily be acquired. Should, however, the amateur find it more convenient at first to have his plates developed for him by a professional artist, the company undertake to do this for him on reasonable terms, as well as the printing of the copies from the negative, if required. There seems to be little reason, therefore, why he should not be able to make the calling a profitable one within a very short time of his adopting it. It would become more remunerative in proportion to the skill and aptitude which

\* This relates to the non-purchasers of apparatus.

he displayed in following it. There is, of course, the question of a little necessary outlay at starting to be considered ; and here we would warn the reader against the idea of any successful work being capable of accomplishment with very cheap sets of apparatus. He can do but little with any photographic equipment that costs less than from about ten to fifteen pounds.

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### *THE "LADIES' PICTORIAL."*

#### A NEW PASTIME FOR LADIES.

It is somewhat surprising, considering how very simple the art of photography has now become, that amateurs,—especially lady amateurs,—have been so slow to avail themselves of its numerous advantages. "Give a dog a bad name and hang him," is an adage that seems to have been specially applied to photography ; though, in this case, considering how thoroughly the "dog" has cleared itself of the bad name it once,—certainly, amongst amateurs,—possessed, it should be entitled at least to a reprieve, if not to absolute pardon.

Less than half a century ago little was known of the "mysteries" of the art ; and, as regards amateurs, we may safely say that they had not ventured to enter the arena, though now they vie, and often successfully, with the professional artist. Until within a comparatively recent period, however, those amateurs who practised photography for amusement were impeded to a great extent by the cumbersome paraphernalia the old "wet" process entailed, the transport of which on a touring expedition was dis-

heartening in the extreme ; and, in addition to this, there was the disadvantage of the dirty nature of the process : the stains from the chemicals employed not only ruined the dress, but left the hands in such a state that they were not presentable for weeks.

We do not propose to go into technicalities, nor to explain all the changes that have recently taken place whereby photography has now become, by reason of its easy accomplishment, an enticing and novel pastime for those who can afford to purchase the necessary apparatus. Suffice it to say that the now discarded "wet" process, in which the plates had to be coated with collodion, and then sensitised in a nitrate of silver bath before their exposure to the light could be effected, has now been abolished, and a "dry" process introduced in its stead, which permits of the plates being purchased ready prepared. This is eminently desirable to lady artists, for thereby the only objectionable feature in connexion with what is undoubtedly a beautiful art is at once dispensed with, and all the amateur of the "gentler sex" need take with her, besides the camera and lenses, is half a dozen boxes of ready-made and sensitised plates, the whole of which,—thanks to the improvements which have been effected with a view of encouraging the practice of photography by amateurs,—will pack into compass the size and weight of which is scarcely appreciable.

It is not necessary to "develop" the plates immediately after exposure, for they can then be put aside for development with equally good results months after they have been taken. This last advantage is of quite recent discovery, and by its introduction the last possible objection to photography as an amusement for ladies has been overcome.

This will no doubt be clear to many of our readers, and possibly the question will then arise, "Where can I be taught how to photograph successfully?" To this

we can give a ready answer. The London Stereoscopic Company, of 108 and 110, Regent Street,\* one of the oldest-established houses in the profession, remarking how very popular amateur photography had become, especially with our Transatlantic cousins, decided to open at the above address a studio devoted entirely to amateurs. This studio—which, we may mention, is both large and excellently lighted,—has now been in existence for several months, and we have reason to believe that a very large number of pupils have availed themselves of the liberal terms offered by the company, which include absolutely gratuitous instruction to the purchasers of their superior apparatus. The tuition is given privately, not in classes; the advantage of this to the diffident beginner is at once apparent. Moreover, by this system, proficiency is much more readily attained.

We are confident that ere long photography will be regarded as a sure antidote for *ennui*,—a malady, we fear, to which many of the daughters of Eve are specially liable,—and that the day is not far distant when a set of photographic apparatus—so invaluable as a “kill-time”—will be considered indispensable to the complete appointment of our country houses.

It is hardly necessary for us to point out how greatly the pleasures of tourists would be enhanced if they had with them the means of reproducing such scenes as they might be desirous of retaining within their recollection. When the holiday jaunt is over, and the, perhaps, dull routine of home-life is resumed, how pleasant must be the double satisfaction of being able to recall the scenery we most admired, and to listen to the praises of our friends while exhibiting the results of our artistic skill. A collection of such views bound in albums is not only a

\* Note the address.



good cure for boredom, and a first-class medium for promoting conversation, but, moreover, it is far and away more interesting to the casual observer than the portrait albums usually offered for inspection, which latter can scarcely be of surpassing interest to any one out of the family circle.

The rudiments of landscape photography are comparatively easy of acquirement ; a knowledge of how to focus correctly and the ability of judging the length of time necessary for the exposure of the plates are the two most important points. Should the amateur be not sufficiently ambitious to trouble about personally developing the negatives, the plates can be sent to the Stereoscopic Company's studio, where the picture will be completed.

THE END.

# THE CAMERA

*A Monthly Magazine for all those interested in the Practice of Photography.*

PUBLISHED ON THE 1ST OF EVERY MONTH.

Yearly Subscription (including Home Postage), 7s. 6d.

To the Continent, Canada, United States, and Egypt, 7s. 6d.; to West Indies and South America, 9s.; to the East Indies, China, &c., 10s. 6d.; to South Africa, 12s.; to Australia, New Zealand, &c., 14s.

ALL SUBSCRIPTIONS ARE PAYABLE IN ADVANCE.

*Cheques and Money or Postal Orders to be made payable to the Publishers, Messrs. WYMAN & SONS.*

## PRESS OPINIONS.

*The Graphic* says: "Professionals as well as amateurs will doubtless welcome the latest addition to periodical literature."

*The Queen* says: "Of general interest to practical people."

*The Pictorial World* says: "We can confidently recommend it to all our readers who take an interest in photography."

*The Times* (Weekly Edition) says: "This new magazine, if it maintains its early promise, will be duly appreciated by all who care for the particular art to which it is specially devoted."

*The Mail* says: "It affords promise of great assistance to the numerous class who take a practical interest in photography."

*The Builder* says: "'THE CAMERA' is a new aspirant for favour. It is edited by Mr. T. C. Hepworth, and contains interesting articles by Mr. R. A. Proctor, Mr. J. S. Hodson, Mr. T. H. Joyce, Dr. G. Lindsay Johnson, and the Editor."

*The Building and Engineering Times* says: "'THE CAMERA' will, we think, prove a boon to all who practise the art of photography, which now takes an important rank in connexion with architectural studies."

*The Irish Builder* says: "Will be appreciated by photographers, both amateur and professional."

*The Illustrated Carpenter and Builder* says: "The first number contains interesting articles."

*The Weekly Dispatch* says: "Very effective, entertaining, and instructive."

*The Northern Whig* says: "Doubtless the outcome of the great strides which amateur photography has made within the last few years. The articles and papers in the magazine will be found useful both to amateur and professional photographers."

*The Aberdeen Evening Gazette* says: "It gives promise of affording a large amount of useful knowledge to amateur photographers, who are by no means few in number."

*The Sheffield Daily Telegraph* says: "Several beautiful illustrations of the art are given, the most lovely of which is a portrait of Miss Mary Anderson."

*The Literary World* says: "It promises to be both helpful and interesting."

*The People's Journal* says: "It contains a variety of papers on several branches of the art, a number of illustrations, with a full-page portrait in photo-gravure of Miss Mary Anderson as Parthenia. Is well printed."

*The West London Observer* says: "'THE CAMERA' should prove an acquisition to the professional as well as the amateur photographer."

*The Bath Chronicle* says: "It is ably edited, and appropriately illustrated."

*The Builders' Reporter* says: "It contains some ably written articles by well-known writers."

*The Sunderland Weekly Echo* says: "Contains a deal of matter interesting to both amateurs and professors of the art. The frontispiece is a beautiful engraving. . . . A most creditable production."

*The Northern Chronicle* says: "Among the papers in the first number, all of which are well written and of deep interest to photographers, is one by Mr. R. A. Proctor on 'Photography and Astronomy.'"

LONDON: WYMAN & SONS, 74, 75, & 76, Great Queen-street, W.C.

LORD AND LADY WILLIAM SEYMOUR.

M

## *The A B C of Photography.*

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### Extracts from the "Amateur Photographer" relating to the Company's Amateur Photographic Exhibition.

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"SIR,— . . . 'Palmar qui meruit ferat'; and, for my own part, I think the whole amateur world is much indebted to the London Stereoscopic and Photographic Company for their bold undertaking. And I trust their venture may hereafter bring them a large amount of amateur support; for to have organised such an Exhibition, and to have awarded some 40 or 50 medals, is certainly showing the Amateur Photographic Societies of Great Britain what *can* be done.

Yours truly,

Queen's Elm, South Kensington,  
*May 8th, 1885."*

FRANCIS C. HARCOURT.

"SIR,—I quite concur in his remark as to this enterprising firm having earned the thanks of all amateur photographers, whether in England or abroad, and in my opinion, if Mr. Harcourt and those of your readers interested in these exhibitions *purchase their requirements* in future from the Stereoscopic Company, we shall then always be able to reckon on having a good and representative exhibition found us, without any of the expense and trouble falling on our shoulders. . . .

I am, Sir, yours faithfully,

*May 15th, 1885."*

EDWIN J. MORNAY.

"SIR,— . . . Mr. Mornay's remark, that amateurs should go to the Stereoscopic Company in future for all their photographic requisites I quite endorse, as I think they certainly deserve our support. . . .

I am, Sir, yours truly,

HELEN DAY.

423, Fulham Road, South Kensington, S.W.  
*May 22nd, 1885."*

"SIR,— . . . They thoroughly deserve the support of all amateurs. And even for my own part, had I found them slightly dearer (which I certainly have not), they would, on the principle of a fair 'quid pro quo,' have had my support . . .  
*November, 1885."*

A. FALKIRK.



## SPECIAL NOTICE.

---

### THE LONDON STEREOSCOPIC COMPANY

HAVE SUPPLIED A LONG-FELT WANT BY OPENING

## SPECIAL STUDIOS,

WHERE Instruction is given, *Free of Charge*, to Purchasers of certain Sets, while non-Purchasers can receive a sound course of Instruction in every branch of the art of Photography, at *Moderate Charges*.

---

A Staff of Competent Artists always on the Premises.

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Terms on application at 110 & 108, Regent St., W.

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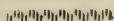
*N.B.—No Class Tuition.*

*Each Pupil receives separate and personal Instruction.*

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See our PRICE LIST of Photographic Specialities in Amateurs' Complete Sets of Apparatus, from 21s. to 50 Guineas.

THE COUNTRY HOUSE.



HOME LESSONS

IN

PHOTOGRAPHY.



MANY persons living at a distance from town, who are unable to avail themselves of the gratuitous course of instruction *advertised*, can arrange for a gentleman to be sent to their houses to teach all that is necessary.

---

*Terms on application. Reduced Charges to  
Purchasers of Apparatus.*

---

*N.B.—IN ADDITION TO THE KNOWLEDGE OF THE ART  
THAT IS IN THIS WAY ACQUIRED, A SERIES OF VIEWS  
OF THE MANSION OR ESTATE WILL, IF DESIRED, BE  
TAKEN BY THE PROFESSIONAL ARTIST SENT.*



## FINISHING LESSONS.

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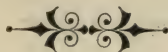
**A**MATEURS who have already mastered the elementary knowledge of Photography, and are desirous of extending that knowledge to the higher branches of the art, such as Enlarging, Micro-Photography, Lantern Transparencies, Retouching, &c., can make arrangements with the Company for a course of Lessons in all or any of the above branches.

---

TERMS ON APPLICATION AT

110, *REGENT STREET, W.*





## TO CYCLISTS.

---

THE LONDON STEREOSCOPIC COMPANY  
invite the personal visit of Cyclists to inspect their  
various arrangements for attaching the Photo-Apparatus  
to a machine without inconveniencing the rider.

Every requisite an Amateur Photographer can require  
kept in Stock ; also Gelatino-Chloride Plates for Magic  
Lantern Slides, the New Rapid Printing Paper, Enlarging  
Apparatus, and General Photographic requirements for the  
practice of the higher branches of the Art.





THE LONDON STEREOSCOPIC COMPANY'S  
**AMATEUR PHOTOGRAPHIC SETS.**

FREE  
LESSONS



FREE  
LESSONS

**GIVEN WITH ALL SETS OF APPARATUS,**

*With the exception of Nos. 1, 2, & 3.*

1.—The "Youth's" Set for taking pictures					
$4\frac{1}{4} \times 3\frac{1}{4}$ inches	...	...	...	£1	1 0
2.—The "Complete" Set	"	"	...	2	2 0
3.—The "Eton" Set	"	"	...	3	10 0
4.—The "Popular" Set	"	"	...	5	5 0
5.—The "Portable" Set	"	"	...	6	10 0
6.—The "Cyclist's" Set	"	"	...	7	7 0
7.—The "College" Set	"	"	...	10	10 0
8.—The "Engineer's" Set	"	"	...	13	13 0
9.—The "Cyclist's" Set for taking pictures					
$6\frac{1}{2} \times 4\frac{3}{4}$ inches	...	...	...	15	15 0
10.—The "India" Set	"	"	...	17	17 0
11.—The "Yachting" Set	"	"	$7\frac{1}{2} \times 5$	21	0 0
12.—The "Yachting" Set	"	"	No. 2	25	0 0
13.—The "Company's" Whole Plate Set for taking pictures	$8\frac{1}{2} \times 6\frac{1}{2}$ inches	...	...	30	0 0
14.—The "Company's" Superior	do.	...	...	35	0 0
15.—The "Company's" $10 \times 8$ Set	...	...	...	40	0 0
16.—The "Company's" Superior	do.	...	...	45	0 0
17.—The "Company's" for $12 \times 10$ pictures	...	...	...	50	0 0
18.—The "Company's" Superior	do.	...	...	55	0 0

*Particulars of the Contents of these Sets will be found in the Company's Illustrated Price List, free by post.*

## THE LONDON STEREOSCOPIC COMPANY'S **LENSES**

Are English Made, and Guaranteed Perfect.

### THE RAPID RECTILINEAR LENS.

No. 1.—	For taking pictures with	open aperture ... ..	$4\frac{1}{4} \times 3\frac{1}{4} \dots$	£2	2	0
No. 2.—	"	"	$6\frac{1}{2} \times 4\frac{3}{4} \dots$	3	3	0
No. 3.—	"	"	$8\frac{1}{2} \times 6\frac{1}{2} \dots$	5	5	0
No. 4.—	"	"	$10 \times 8 \dots$	6	6	0
No. 5.—	"	"	$12 \times 10 \dots$	7	7	0
No. 6.—	"	"	$15 \times 12 \dots$	11	11	0
No. 7.—	"	"	$18 \times 14 \dots$	14	14	0
No. 8.—	"	"	$20 \times 16 \dots$	15	15	0
No. 9.—	"	"	$24 \times 20 \dots$	21	0	0

### THE COMPANY'S WIDE-ANGLE OR PORTABLE SYMMETRICAL LENSES

Give an angle of about 90 degrees, and are unsurpassed for Interiors, Panoramic Effects, Architectural and general Landscape Subjects.

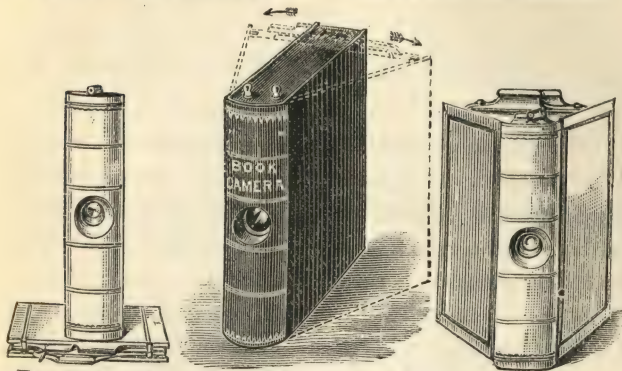
Prices same as Rectilinear Pattern quoted above.

*Single Landscape and Portrait Lenses at exceptionally low prices, and of first-class workmanship.*

Price List, giving particulars of each Lens,  
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The London Stereoscopic and Photographic Company's

## NEW DETECTIVE BOOK CAMERA



### For Instantaneous Pictures of Moving Objects.

FOR many years the great want in Photography has been an exceedingly portable, but rapid, detective Camera for taking random shots at moving objects. This is exactly what **The Company's New Detective Book Camera** is designed for, and so admirably does it answer its purpose that amateurs and professionals alike grant it to be the **most perfect** detective Camera ever invented.

*Its advantages are:—*

Extreme portability. Weight.

Can be carried as an ordinary book, or will go into the coat pocket.

Fitted with a special Rapid Rectilinear lens.

Can be exposed instantaneously or for any length of time by means of a cleverly-regulated shutter.

Is always in focus.

Will take pictures  $4\frac{1}{4} \times 3\frac{1}{4}$  (ordinary standard size).

Equally useful for Portraits, Landscapes, Architectural Subjects, and Photographs of rapidly-moving objects.

**RESULTS—PERFECT!**

**Cash Price, with Fittings to carry 6 Plates, £6. 6s.**

Full Printed Instructions sent out with each.

**Address: The London Stereoscopic & Photographic Co., Limited,**  
110 & 108, REGENT ST., W.; and 54, CHEAPSIDE, E.C.

## THE "READY" FINDER.

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*For Block showing "Ready" Finder see page 15.*

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The accompanying block will at once illustrate the use of this "Ready" Finder. Doubtless all amateurs have found the necessity for some means of easily and quickly seeing that the object which is to be taken instantaneously is directly in the centre of the plate. Many finders have been made, but they all fail in the one main point, viz., the ability to see the passing yacht, train, or horse depicted exactly as it is on the dry plate. It can be adapted to any camera in less than a minute, is extremely portable, forming a cube of about  $2\frac{1}{2}$  inches square.

Price (to fit *all* cameras), 10s. 6d.

*N.B.—The L. S. Co. are the sole makers and vendors of the above "Ready" Finders.*

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*Extract from "AMATEUR PHOTOGRAPHER," June 12th, 1885.*

"The Stereoscopic Company also show an extremely simple form of Finder. In appearance it looks like a miniature camera. It consists of a lens and small pane of ground glass, and is so arranged that when placed upon the top of the camera with the little lens parallel to the lens beneath, the image of the field of view is seen on the little ground glass. The operator standing on the right of his camera can see in the small pane of glass above when the moving object has arrived within the radius of the field, and can then release the shutter. It is an admirable contrivance."



## THE LONDON STEREOSCOPIC COMPANY'S

### DRY PLATES

are perfectly unequalled in their beautiful results. Their rapid sale and extreme popularity are guarantees of their great excellence, while the price at which the L. S. Co. are enabled to sell them will be recommendations to all. Their special features are—**Uniformity ! Cleanliness ! Rapidity ! Vigour !**

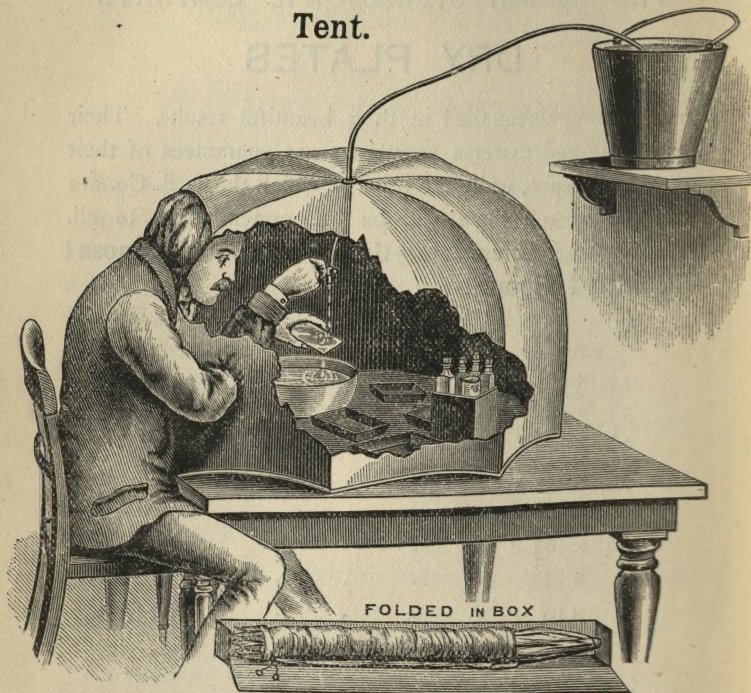
Sizes.							Per Dozen.
							<i>s. d.</i>
$4\frac{1}{4} \times 3\frac{1}{4}$	-	-	-	-	-	-	1 6
5 × 4	-	-	-	-	-	-	2 6
$6\frac{1}{2} \times 4\frac{3}{4}$	-	-	-	-	-	-	3 6
$7\frac{1}{2} \times 5$	-	-	-	-	-	-	5 0
8 × 5	-	-	-	-	-	-	6 0
$8\frac{1}{2} \times 6\frac{1}{2}$	-	-	-	-	-	-	7 6
10 × 8	-	-	-	-	-	-	10 6
12 × 10	-	-	-	-	-	-	15 0

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